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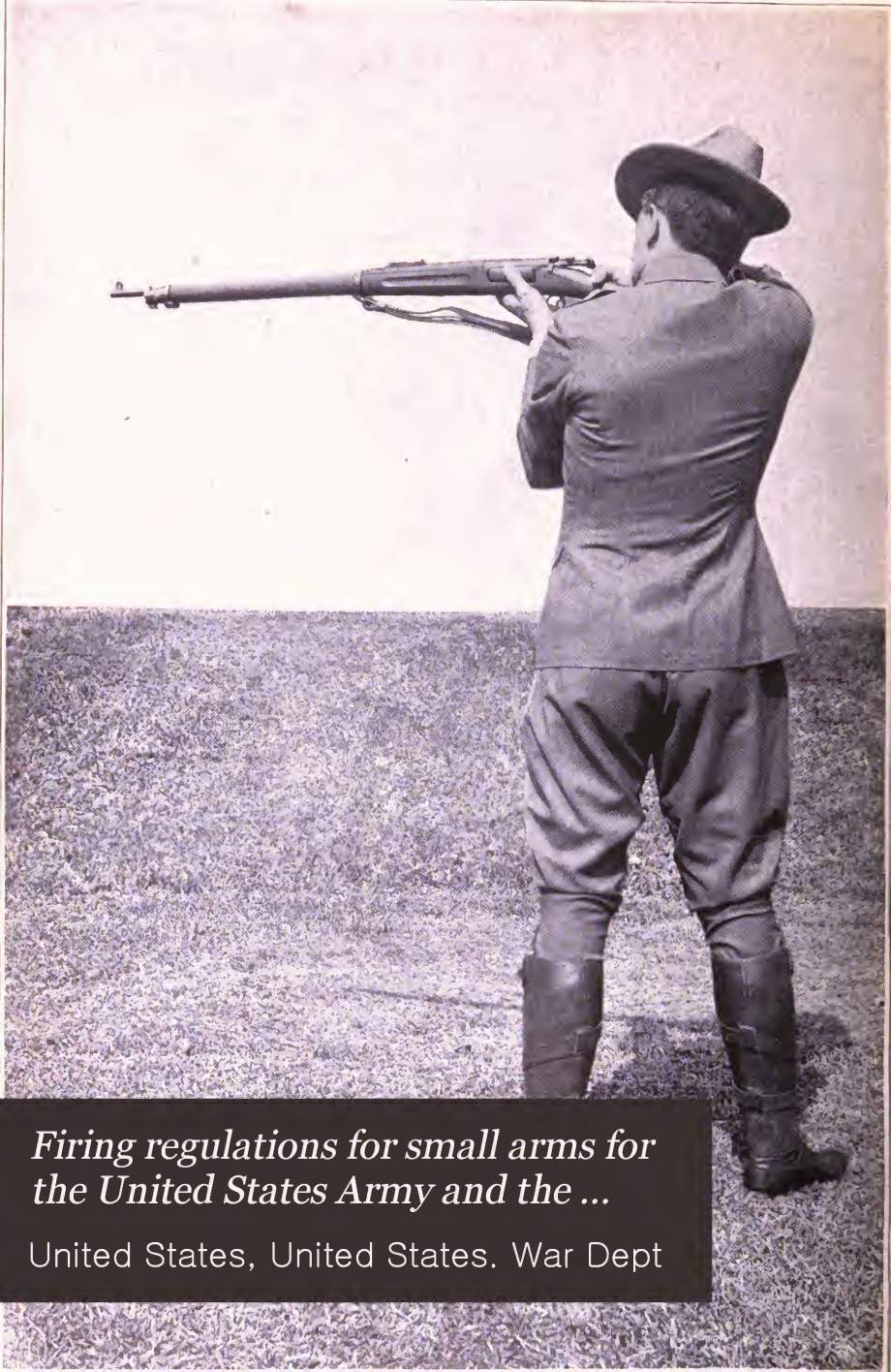

Firing regulations for small arms for the United States Army and the ...

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FIRING REGULATIONS

FOR

SMALL ARMS

FOR THE

UNITED STATES ARMY

AND THE

ORGANIZED MILITIA OF THE UNITED STATES.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1904.

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WAR DEPARTMENT,

WASHINGTON, D. C., *January 1, 1904.*

The revision of the system of "Firing Regulations for Small Arms," proposed by a board of officers consisting of—

Lieut. Col. James Parker, U. S. Cavalry, assistant adjutant general;

Maj. John F. Guilfoyle, Twelfth Cavalry, inspector of small-arms practice;

Maj. William A. Mann, General Staff;

Maj. Frederick W. Sibley, Eleventh Cavalry;

Capt. Harry C. Hale, General Staff;

is approved and herewith published for the information and guidance of the Regular Army and the organized militia of the United States.

E. ROOT,

Secretary of War.

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NOTE.

The first system of target practice for the Army was prepared by Capt. Henry Heth, Tenth Infantry, and adopted by the War Department in 1858, "for the use of troops when armed with a musket, rifle musket, rifle, or carbine." In 1872 a "Manual for Rifle Practice" was prepared by Gen. George W. Wingate, inspector general of rifle practice, National Guard of New York, who first inaugurated rifle practice as a regular part of the military instruction of the National Guard. His advice and suggestions were largely followed by army marksmen. The first complete systematic course of instruction in rifle firing for the United States Army was prepared by Col. T. T. S. Laidley, of the Ordnance Department, under the instruction of the Chief of Ordnance, and was published with the approval of the Secretary of War in 1879. This work led to such excellent results in the target practice of the Army, that, in 1883, it was found advisable that a new work be prepared to embody the experience gained on this subject. For this Capt. Stanhope E. Blunt, Ordnance Department, was designated by the Chief of Ordnance, with the approval of the Secretary of War, and the result was the publication in 1885 of "Blunt's Rifle and Carbine Firing," which received the approval of a board of officers, of the Lieutenant General of the Army, and of the Secretary of War.

With two slight revisions by Captain Blunt, and the change of title to "Firing Regulations for Small Arms," this book was the authorized guide for small-arms practice until April, 1896, when, on account of the adoption of the new magazine rifle, a small manual of firing regulations, prepared by a board of officers consisting of Col. J. C. Bates, Second Infantry; Lieut. Col. Charles A. Wikoff, Nineteenth Infantry, and Capt. Marion P. Maus, First Infantry, was published, for temporary use, by order of the Secretary of War.

The progress of the Army in target practice since the publication of Captain Blunt's book, together with the change of arms to the magazine rifle, made a more complete revision of the "Firing Regulations for Small Arms" necessary. Capt. John S. Mallory, Second Infantry, was therefore detailed in February, 1897, by the Major General Commanding the Army, with the approval of the Secretary of War, to make such a revision, and his work, with slight amendments, was approved by a board of officers consisting of Col. J. C. Bates, Second Infantry; Maj. A. R. Chaffee, Ninth Cavalry; First Lieut. R. C. Van Vliet, Tenth Infantry, with Capt. John S.

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Mallory as recorder, and was published in General Orders, No. 26, Adjutant General's Office, June 11, 1897. The revised work, with some minor changes, having received the approval of the Major General Commanding the Army and the Secretary of War, was then published for the information and guidance of the Army.

From 1898 to 1901, inclusive, the demands of the service precluded the prosecution of systematic target practice, but in 1902 it was resumed, and soon developed the fact that the changed conditions demanded a revision of the existing regulations.

A board of officers, consisting of Maj. James Parker, U. S. Cavalry, assistant adjutant general; Maj. John F. Guilfoyle, Twelfth Cavalry; Maj. William A. Mann, Fourteenth Infantry; Maj. Frederick W. Sibley, Eleventh Cavalry, and Capt. Harry C. Hale, Twentieth Infantry, was therefore convened for the purpose of revising the "Firing Regulations for Small Arms," and the work of this board, having been approved by the Secretary of War, is herewith published and issued for the information and guidance of the Army and the organized militia of the United States.

In the preparation of these regulations the board has consulted with, and received assistance from, many officers of the Regular Army and National Guard, and while unable to enumerate all such sources of assistance, space must be given to the most prominent ones to whom the thanks of the board are due and are hereby tendered.

The board is specially indebted to—

Lieut. Col. Stanhope E. Blunt, Ordnance Department, author of "Small Arms Firing Regulations";

also to—

Lieut. Col. William A. Simpson, assistant adjutant general, in charge of the Bureau of Military Information;
Maj. C. H. Ourand, inspector general, District of Columbia militia;
Maj. J. E. Bell, inspector of rifle practice, District of Columbia militia;
Col. W. P. Hall, assistant adjutant general, U. S. Army;
Brig. Gen. B. W. Spencer, New Jersey National Guard;
Lieut. Col. E. J. Dimmick, Illinois National Guard;
Maj. Colville P. Terrett, Twelfth Infantry;
Capt. Frank L. Graham, Porto Rico Provisional Regiment of Infantry;
The members of the board of officers testing the proposed new Springfield magazine rifle;
First Lieut. H. A. Drum, Twenty-seventh Infantry, A. D. C., and
Mr. René Bache, Washington, D. C.

It should be added that Part IX, "Fire Discipline," is extracted mainly from Batchelor's "Infantry Fire," and that Part II, "The Rifle and Carbine," and Chapter I, Part V, "The Pistol," are compiled from publications by the Ordnance Department, U. S. Army.

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FIRING REGULATIONS

FOR

SMALL ARMS.

INTRODUCTION.

IMPORTANCE OF RIFLE FIRE.—In an engagement of all arms the fire of infantry must always be the most important factor, and by infantry fire will the result of battles be most frequently decided.

NUMBER OF HITS ALL-IMPORTANT.—As the effect of infantry fire depends upon the number of hits made, not upon the number of shots fired, it follows that soldiers who can not hit what they shoot at are of little value on the field of battle.

To send troops into battle without thorough preparatory training in the use of their arms is to expose them to death uselessly.

OBJECT OF INSTRUCTION.—The object of instruction in small-arms firing is to develop in a body of troops such proficiency in the use of their arms as shall make their fire in battle effective under all conditions.

EFFICIENCY; HOW ATTAINED.—In order to accomplish this, soldiers should have practice in firing individually and in bodies; from a fixed position, and when advancing and retreating; at stationary or at movable and disappearing targets; with slow fire and rapid fire; and they should be able when separated from their officers, when acting as sharpshooters or scouts, to estimate the distance from the enemy with accuracy.

SCOPE OF INSTRUCTION.—The course of instruction in rifle firing laid down in this manual includes the following:

1. Nomenclature of the rifle; care and preservation of the rifle; general principles governing the motion of projectiles.
2. Tripod-sighting drills.
3. Position and aiming drills.
4. Gallery practice.
5. Estimating-distance drills.
6. Individual range and skirmish firing, instruction practice.
7. Individual range and skirmish firing, record practice.
8. Company volley firing, record practice.
9. Company fire at will, record practice.

The course of pistol firing includes the following:

1. Nomenclature of the pistol; care and preservation; general facts and principles.

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2. Position and aiming drills, and rapid-fire drills; dismounted and mounted.

3. Practice with blank cartridges, mounted, on the track at targets.

4. Individual firing, instruction practice.

5. Individual firing, record practice.

PERIOD OF PRELIMINARY INSTRUCTION.—The portion of the year which immediately precedes the instruction of the soldier upon the target ground will be utilized by laying, by a thorough course of the preliminary drills and gallery practice, the only enduring foundation for future proficiency. This especially applies to recruits and those who in the last season failed to qualify above the second class. The instructors will also improve this opportunity for explaining the different theoretical principles, as far as the capacity and interest of the men appear to render it advantageous; and for conducting such exercises in estimating distances as may be necessary. Recruits should also receive preliminary instruction during the month after joining their commands.

As the successful education of the soldier in rifle firing requires that the causes of his errors as well as their nature should be determined before they can be overcome, and as this can only be done under the most favorable conditions, department commanders should include in the regular practice season the months most favorable for his instruction.

DEPARTMENT INSPECTOR OF SMALL-ARMS PRACTICE.—In each department an inspector of small-arms practice, selected with reference to his special fitness and practical qualifications for supervising the course of instruction, will be appointed, whose duty it will be to examine the regular reports of firings, and from these reports to keep the department commander informed of the absolute and comparative degree of proficiency manifested by the troops of the various posts and companies in the department.

He will also, from time to time, report to the department commander any suggestions with reference to obtaining increased proficiency.

DUTIES OF POST COMMANDERS.—For the amount of instruction received by their commands, and for the degree of proficiency which they manifest, post commanders will be primarily responsible, and it is expected that they will exact from the troops under their command the highest degree of proficiency attainable. It will be their duty to direct and conduct the instruction of their officers in the general theoretical principles of the subject, and by frequent supervision of the preliminary drills and exercises, and of the target practice of the companies, to assure themselves that the captains and their assistants are thoroughly conversant with all the details of the course; that they conduct the instruction of their men with energy and judgment, and where any deviations are made from the prescribed methods

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of instruction, that they are only those best adapted to secure the most favorable results.

DUTIES OF BATTALION COMMANDERS.—Battalion and squadron commanders will supervise the target practice of their commands.

THEORETICAL INSTRUCTION OF NONCOMMISSIONED OFFICERS.—Company commanders will so conduct the theoretical instruction of their noncommissioned officers that they may be enabled to render intelligent assistance in the instruction of the company.

DUTIES OF COMPANY OFFICERS.—The education of the men in small-arms firing will be under the immediate supervision of the company commander, assisted by his lieutenants and noncommissioned officers. The different steps in the general system of progressive instruction prescribed in the authorized course will be carefully followed, but the details of the various methods may be modified by the company commander, if the particular circumstances of any special case appear to render a change advisable.

PARTICIPATION OF COMPANY OFFICERS.—Progress in rifle, carbine, and revolver firing depending not only upon the method of instruction, but to a great degree upon the capabilities of the instructors, it is essential that the company officers should themselves become proficient, not only in the theoretical but in the practical details of the subject. They will participate in the preliminary drills and exercises and in the other parts of the course; they will always attend target practice, firing with the men (subject to the provisions of paragraph 106), and endeavoring to excel the company in proficiency with the rifle and carbine, or revolver.

STANDARD OF PROFICIENCY OF A COMPANY.—If the preliminary drills and the higher principles of target firing are thoroughly taught, every soldier, unless he is subject to some physical defect, can by careful practice become so proficient in the use of his weapon as to make his fire at moderate distances—probably up to about 600 yards—fairly effective against individual objects; and a small proportion of the men will develop such an excellence as to extend these limits to 1,000 or 1,200 yards. Where a company consists of men who have reached this stage of proficiency, their collective fire, if properly directed, would be effective against masses of men at all distances up to at least 1,500 yards.

To attain this standard will, however, require on the part of the company officers a most earnest and energetic effort. They should endeavor to awaken the enthusiasm of their men and to foster the spirit of emulation; they should take all possible pains to avoid discouraging the poorer shots, reminding them that while at first they may seem to make but slight progress, yet that a careful attention to the instruction and advice that they receive will ultimately be amply rewarded.

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DISCRETION ALLOWED INSTRUCTORS.—While in the following pages the methods of instruction are often described in considerable detail, it is not intended that they should necessarily be implicitly followed. In many cases the company commander, directly present with his men, and noticing from day to day their peculiarities, can substitute other methods with advantage; but as these instructions offer a guide which, if faithfully adhered to, will usually produce in any body of men a number of good shots, and will so educate a company that the effect of their fire at the different distances met with in action will be greatly increased, it is recommended that they be only departed from after due consideration.

FIELD PRACTICE; EXPERIMENTS.—Ammunition unexpended in the regular course, as in competitions, may be used, under the direction of the post commander, in such field practice or other practice, experimental or otherwise, as may be considered of benefit.

The trial of new kinds of targets, of new methods of firing, and the working out of new problems in field firing will be encouraged.

Department commanders will, in special cases, authorize the expenditure of a limited amount of extra ammunition to post or company commanders who make application to conduct such trials.

In each case the project and the results expected to be accomplished will be definitely explained in the application. Full reports will be made of such practice by the post commander to the department commander.

UNIFORMITY TO BE PREFERRED.—The object of practice firing should be to produce uniformity rather than develop expertness in particular men. A man who has been a good shot during two seasons seldom, if ever, loses his ability to shoot well. The attention of the instructor should, therefore, be concentrated on the poorer shots rather than on the best shots. The figure of merit has, therefore, been so arranged that the company commander will find it more advantageous to advance the poorer shots than to spend time and ammunition in further perfecting men who already are proficient.

ECONOMY OF AMMUNITION.—The course admits of saving ammunition on the best shots and using the extra ammunition in the instruction of the poorer shots.

RECORD COURSE A TEST.—The record is the same for all; it is a test as well as a part of the instruction.

SUPPLEMENTARY PRACTICE SEASON.—With only one practice season recruits joining shortly after it has commenced will go one to ten months without instruction. To remedy this a supplementary practice season is adopted to take place six months after the regular practice season. It is not necessary that the best weather be had during this season.

BULL'S-EYE TARGET.—A radical change adopted herewith is the substitution of the bull's-eye target for the figure target in a part of this course.

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The premises upon which depended the former use of the figure target were, practically, two in number. The first was that with the figure target the soldier always fired at an object resembling a man, and therefore more nearly assimilated his practice in time of peace to that in time of action. The second was that by placing the figure, the object aimed at, at the bottom of the target the soldier learned to aim habitually low.

Regarding the first premise, it may be stated that the object sought is equally attained in the scheme of instruction herewith, inasmuch as the figure target is introduced in rapid fire and retained in skirmish fire.

As to the second premise, it is believed to be an error. The figure was placed at the bottom of the target to teach the soldier to aim low. Inasmuch as a low miss of the figure penalized the soldier with a 0, while a high miss rewarded him with a 2, 3, or 4 (depending upon the range), the result was the opposite of that desired, and the soldier learned to aim high. Moreover, it is believed that it is not a question of the object at which aim is taken. The soldier in aiming sees nothing below the object aimed at, and, being taught always to aim underneath the object, he thus so forms the habit of low aim in practice that he will continue it in time of action, even though his target be a man instead of a paper bull's-eye.

Other reasons for the substitution of the bull's-eye for the figure target in certain parts of the course are as follows:

(*a*) It admits of a more definite point of aim.

(*b*) It gives in scoring a more consistent valuation of hits.

(*c*) It is better adapted to the instruction of recruits.

SHAPE OF BULL'S-EYE.—In consequence of the variations in the different parts of the small arm and in the cartridge, projectiles fired with a constant aim from the same place and under similar meteorological conditions will strike points of the target more or less separated, thus forming what is known as a "shot group." It has been found that, a great number of shots being considered, the general shape of this shot group is an ellipse with the longer axis vertical. With the Springfield rifle, caliber .45, these deviations were considerable, but with the present United States magazine rifle the difference between the mean vertical and the mean horizontal deviations of any shot group is so small (being but 2 inches at 500 yards) that it may be disregarded. For this reason, and for the further one that its adoption has been recommended by a large majority of the officers consulted, the return to the circular bull's-eye has been made.

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PART I.

DEFINITIONS.

Bore.....The cylindrical cavity in the small arms barrel. The diameter of the bore of the United States magazine rifle and carbine is 0.30 inch; of the pistol, 0.363 inch.

Bull's-eye.....The black circular division in the center of the bull's-eye target. Shots in this space have a value of 5.

Butt.....The embankment or other means used to stop bullets in rear of the target. The plural "butts" is used to designate collectively the parapet, pit, and back stop of a group of targets.

Caliber.....The interior diameter of the small arms barrel, measured between the lands. The caliber of the United States magazine rifle and carbine is 0.30 inch; that of the pistol, 0.38 inch.

Cant.....To revolve the barrel of the piece on its axis to the right or left while aiming.

Center.....The annular division of the bull's-eye target embraced between the bull's-eye and the circumference of the next larger circular division of the target. Shots in this space have a value of 4.

Classification.....The arranging of the individuals of an organization in groups or classes according to the degree of skill displayed in record practice on the range with the rifle and carbine. In this system there are six classes: Expert riflemen, sharpshooters, marksmen, first, second, and third class men.

Coach.....A special instructor charged with the duty of directing the firing of a soldier.

Disappearing target.....A target which is exposed to view at a signal and withdrawn after a prescribed number of seconds.

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Disk, marking.....A wooden staff with a sheet-iron disk at each end, used by the marker in the pit in signaling the results of hits on the target—if a bull's-eye, with a white disk; if a center, with a red disk; if an inner, with a black and white disk; if an outer, with a black disk.

Distinguished marksman...An officer or enlisted man who has won three of the authorized medals in department, division, and army rifle or carbine competitions.

Distinguished pistol shot...An officer or enlisted man who has won three of the authorized medals in department, division, and army pistol competitions.

Drift.....The lateral deviation of the bullet caused by the resistance of the air and the rotation of the bullet on its longer axis.

Echelon.....In the order in echelon the targets or firing stands are placed one behind another, to the right or left, and unmasking one another.

Emplacement.....The space on the target range allotted for the position of the target.

Estimating distance.....Calculating approximately by means of range-finding instruments, by sight or by sound, the distance of an object from the observer. Estimating distance is a factor in determining the qualification of the sharpshooter, marksman, first and second class men.

Expert rifleman.....See "Classification," par. 248.

Figure of merit.....A device by which a comparison of the standing in marksmanship between organizations may be instituted. (See pars. 253 to 262.)

Fire.....Firing on the range with the rifle, carbine, or pistol will be known as slow, timed, rapid, skirmish, and collective fire. Slow fire is that in which the time limit is not less than thirty seconds per score and not more than one minute per shot. Timed fire is that in which the time limit is between twenty and thirty seconds for each score at a bull's-eye target. Rapid fire is that in which the time limit is thirty seconds or less for each score fired with the rifle or carbine and ten seconds or less for each score fired with the pistol at a disappearing target. Skirmish fire is

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that varied fire prescribed for the skirmish range at the silhouette targets. Collective fire is the company volley fire and the fire at will taken together. Mounted fire also is classed as rapid fire.

Fire at will.....That class of fire in which, within the restrictions of the command for firing, the individuals deliver their fire independently of the commander and of each other.

Fire discipline....."The unhesitating habit, developed in the men by instruction and training, of commencing, or ceasing, or relaxing the fire, or of concentrating it upon a defined object, all in obedience to the will of the commander."

First-class man.....See "Classification," par. 248.

Gallery, shooting.....A room or inclosure in which firing at small targets at short ranges with reduced charges can be conducted, sheltered from the weather.

Grooves.....The spiral channels around the bore of rifle barrel. In the United States magazine rifle and carbine the grooves are 0.166 inch wide and 0.004 inch deep; in the pistol 0.156 and 0.003, respectively.

Guide.....A noncommissioned officer or private, upon whom the command regulates its march.

Individual practice.....The firing on the range by which the individual soldier receives his instruction and by which his classification is determined.

Inner.....The annular division of the bull's-eye target outside the center. Shots in this space have a value of 3.

Insignia.....A badge or distinguishing mark issued to expert riflemen, sharpshooters, and marksmen to indicate their skill in marksmanship. To the marksman will be issued a silver pin; to the sharpshooter, a silver badge; to the expert rifleman, a silver badge.

Instruction practice.....The prescribed firing on the range which precedes record practice and which is devoted to the instruction of the soldier regardless of the record made by him.

Lands.....Spaces in the bore of the rifle barrel between the grooves. In the rifle and carbine their width is 0.0589 inch; in the pistol, 0.03406.

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Long range.....See "Range."

Marking disk.....See "Disk, marking."

Marksman.....See "Classification," par. 248.

Mid-range.....See "Range."

O'clock.....A term employed to indicate, by means of the divisions on the dial face of the clock, the location of a hit on the target, or the direction from which the wind may be blowing, as a 7 o'clock, 4, or a 5 o'clock wind.

Outer.....The space on the bull's-eye target outside the inner. Shots in this space have a value of 2.

Parapet.....An elevation of earth or other material thrown up in front of the targets to protect the markers.

Pit.....The space between the parapet and the butt or bullet stop, occupied by the markers.

Practice season.....Those portions of the target year devoted to firing on the range. They include the regular season of three months and the supplementary season of one month.

Preliminary drills.....Consist of sighting drills, position and aiming drills, gallery practice, and estimating distance drills.

Preliminary practice.....The prescribed firing on the range which precedes the division and army competitions.

Prone.....Lying flat on the belly. The only position with the body extended on the ground authorized on the range.

Protest.....A formal objection. At competitions protests may be made to any range officer on the ground, against the manner of conducting the competition, or against the value given a competitor's score. Appeal from a range-officer's decision may be made to the officer in charge of the competition.

Qualification.....The grade of marksmanship attained in target practice with the rifle or carbine, depending upon the scores made in record practice therein.

Range.....The tract of land over which firing with small arms is conducted. For convenience, ranges are classified as follows: From the target to 300 yards, short range; 300 to 600 yards, mid-range; 600 to 1,000 yards, long range; all distances beyond 1,000 yards, extreme range.

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Range officer.....A commissioned officer charged with the care, police, etc., of the targets and range at any post. For detail of range-officer's duties, see par. 120.

Record practice.....The prescribed firing on the range, following instruction practice, by which the general proficiency of the soldier and of the organization is determined.

Regular season.....Comprises three consecutive months of the target year, selected by the department commander, in which the prescribed course of target firing on the range is pursued. This season must terminate on or before October 31.

Ricochet shot.....One where the bullet strikes the ground or other object, and is thereby deflected from its original course. Hits on any target from ricochet shots have the same value as direct hits.

Score cards.....Pasteboard cards issued to competitors at the army and division competitions, giving the number of the target of each competitor with his order of firing, and containing a blank space for the record of the shots fired and for the signature of the scorer. These score cards should be of different colors for different ranges, but for all kinds of firing, employing the same color for the same distance.

Score.....Groups of five consecutive shots (exclusive of sighting shots) fired in individual practice. The term "score" is also used to express the result of any series of shots, as the result of a skirmish run.

Second-class man.....See "Classification," par. 248.

Sharpshooter.....See "Classification," par. 248.

Short range.....See "Range."

Shot marks.....Disks of thin sheet steel, 3 inches, 5 inches, and 10 inches in diameter, respectively, with a wire spring of two branches secured to the disk near its center and at right angles to it. They are white, and black, and are used to mark on the bull's-eye target the position of the last shot.

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Sighting shots.....The two trial shots which must precede the soldier's first record score at the 600, 800, and 1,000 yard ranges. They form no part of the score.

Skirmish run.....One advance of the skirmisher or squad on the skirmish targets.

Special courses A, B, and C.Special course A is a course of rifle practice provided for posts where a complete rifle range is not available, but where a range of 200 and 300 yards can be had. Special course B is a course for posts where no range can be obtained. Special course C is a course for the use of the organized militia.

Spotter.....One who, in team practice, announces the value of shots and indicates on a wooden target by means of pins the position of hits on the range target.

Supplementary season.....One month of the target year, selected by the department commander, as nearly midway between the regular annual seasons as practicable, in which the following fire: All recruits who have joined since the close of the regular season, and all who failed to qualify as second-class men during the regular season.

Targets.....*Target A.*—The short-range target. Used for 200 and 300 yards and for dismounted pistol practice. Is a rectangle 6 feet high by 4 feet wide. Black circular bull's-eye, 8 inches diameter, value of hit, 5; center ring, 26 inches diameter, value of hit, 4; inner ring, 46 inches, value of hit, 3; outer, remainder of target, value of hit, 2. A ricochet has the same value as a direct hit.

Target B.—The mid-range target. Used for 500 and 600 yards. Is a square, 6 feet on a side. Black circular bull's-eye, 20 inches diameter: center ring, 37 inches diameter; inner ring, 53 inches diameter; outer, remainder of target. Value of hits, same as on target A.

Target C.—The long-range target. Used for 800 and 1,000 yards. Is a rectangle, 6 feet high and 12 feet wide. Black circular bull's-eye, 36 inches diameter; center ring, 54 inches diameter; inner space outside of center ring bounded

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by vertical lines 3 feet from each end of target; outer, remainder of target. Value of hits, same as on target A.

Targets D and E.—Skirmish targets. These are steel skeleton frames, representing the outline of a soldier in firing positions—kneeling and lying, respectively—covered with cloth and with black paper, cut as silhouettes to the shape of the frames.

Target F.—Disappearing target. Silhouette of soldier in the kneeling position, placed in the middle of a rectangular target, 6 by 6 feet. Value of hits, direct or ricochet: In figure, 5; in the space (except the figure) bounded by the rectangular lines nearest the figure, 4; in the next outer space bounded by the next outer rectangular lines, 3; in the remainder of the target, 2.

Target G.—Group skirmish target. Composed of the two figure targets D and E, placed in line, forming a group, the kneeling figure on the military right, the distance between the centers of figures being 1 yard. Value of hits, direct and ricochet, on lying figure, 5; on kneeling figure, 4. Hits on or within the steel frame, only, count.

Target H.—This is a steel skeleton frame, representing a soldier in the standing position, covered with cloth and with black paper, cut as a silhouette to the shape of the frame. For the mounted firing, a horizontal line is drawn across this target at its middle point. Hits above this line are scored 2; below the line, 1.

Target K.—Disappearing target. Silhouette of a soldier in the standing position on a rectangular target, 4 by 6 feet, the feet of the silhouette resting on the lower line of the target. Value of hits, direct or ricochet, on figure, 5; on target, outside of figure, 2.

Target L.—Collective-fire target. Composed of three lines, in closed order, of the silhouette targets D and E and H; the first line formed by

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16 of the figure E, the second by 16 of the figure D, and the third by 16 of the figure H, the line of kneeling figures being placed at the distance designated for practice, the line of lying figures 10 yards directly to its front, and the line of standing figures 20 yards directly to its rear. Value of hits, direct or ricochet, on any figure, 1.

Target M.—This is a skeleton steel frame representing a soldier mounted, covered with cloth and with black paper cut as a silhouette to the shape of the frame. Value of hits, direct or ricochet, above a horizontal line drawn across the target from lowest point of the horse's head, 2; those below that line, 1.

Target X.—Miniature target. Used in special course B. Is a rectangular paper target 8 by 12 inches. Black circular bull's-eye, $1\frac{1}{3}$ inches diameter; center ring, $4\frac{1}{3}$ inches diameter; inner ring, $7\frac{2}{3}$ inches diameter; outer, remainder of target. Value of hits same as on target A.

Target Y.—Miniature target. Used in special course B. Is a rectangular paper target, 4 by 6 inches. Black circular bull's-eye, $\frac{2}{3}$ inch diameter; center ring, $2\frac{1}{16}$ inches diameter; inner ring, $3\frac{5}{16}$ diameter; outer, remainder of target. Value of hits same as on target A.

Target Z.—Miniature target. Used in special course B. Is a rectangular paper target, $2\frac{2}{3}$ by 4 inches. Black circular bull's-eye, $\frac{4}{9}$ inch diameter; center ring, $1\frac{4}{9}$ inches diameter; inner ring, $2\frac{5}{9}$ inches diameter; outer, remainder of target. Value of hits same as on target A.

Target year.....Commences January 1 and terminates December 31.

Telescopic sight.....A telescope or other device attached to the barrel of the piece so as to enlarge the object when aiming at long ranges.

Third-class man.....See "Classification," par. 248.

Trajectory.....The path described by the bullet moving under the influence of the projectile force, the force of gravity, and the resistance of the air.

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Twist.....The spiral formed by the grooves in the barrel of a rifled piece. In the United States magazine rifle, model 1898, and magazine carbine, model 1899, this twist is uniform, one turn in 10 inches. In the pistol it is one turn in 16 inches.

Windage.....The influence of the wind in deflecting the bullet from the point at which it is aimed; also applied to the amount of change made on the wind gauge.

Wind gauge.....A graduated attachment to the sights of the rifle and carbine by which allowance can be made, in aiming, for the effect of the wind upon the bullet.

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PLATE I.

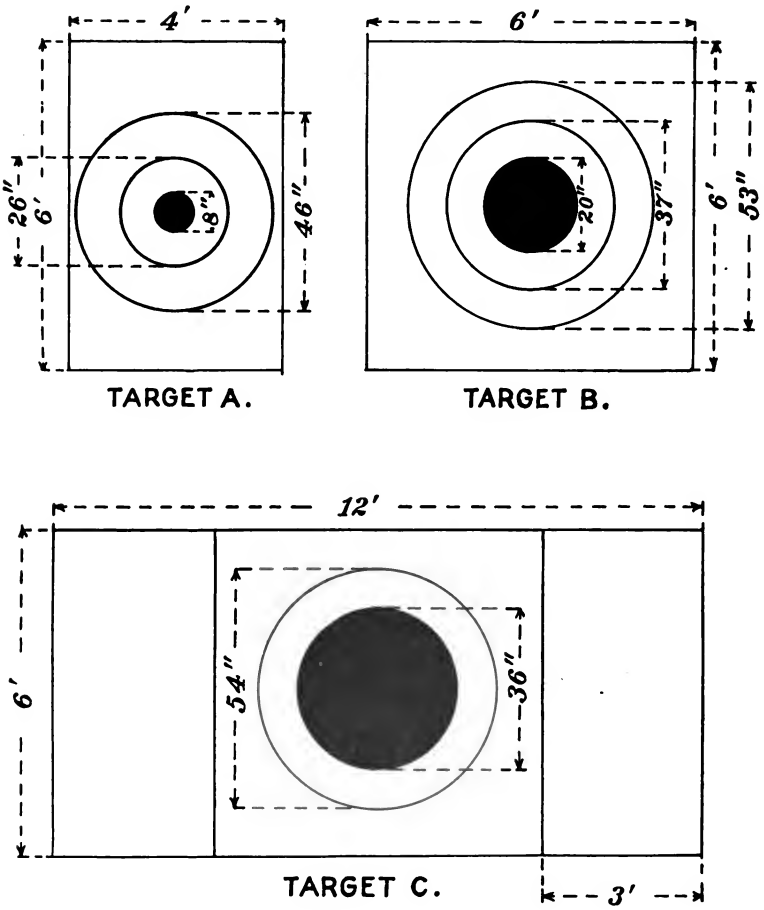

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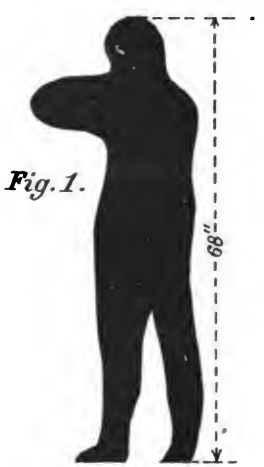
PLATE II.



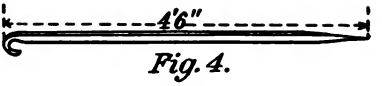


PLATE III.

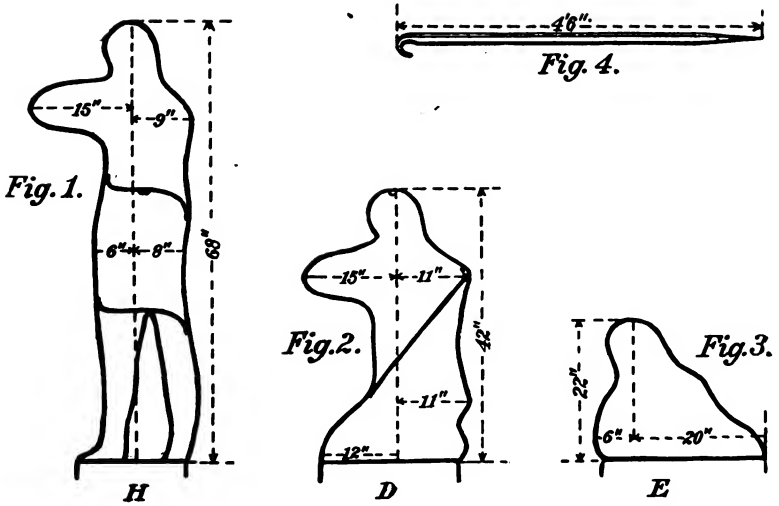


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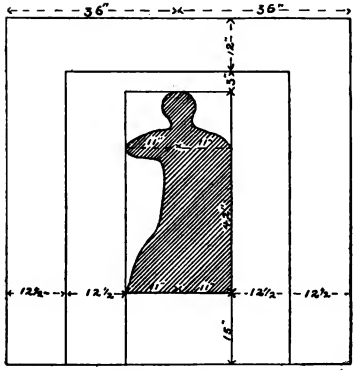
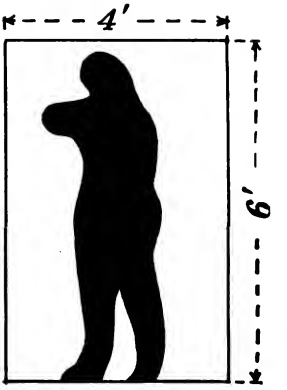
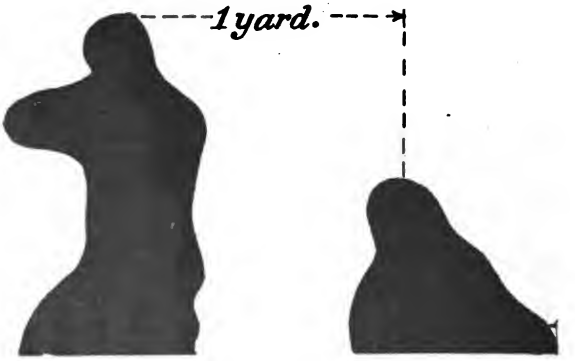
PLATE IV.



TARGET F.



TARGET K.



TARGET G.

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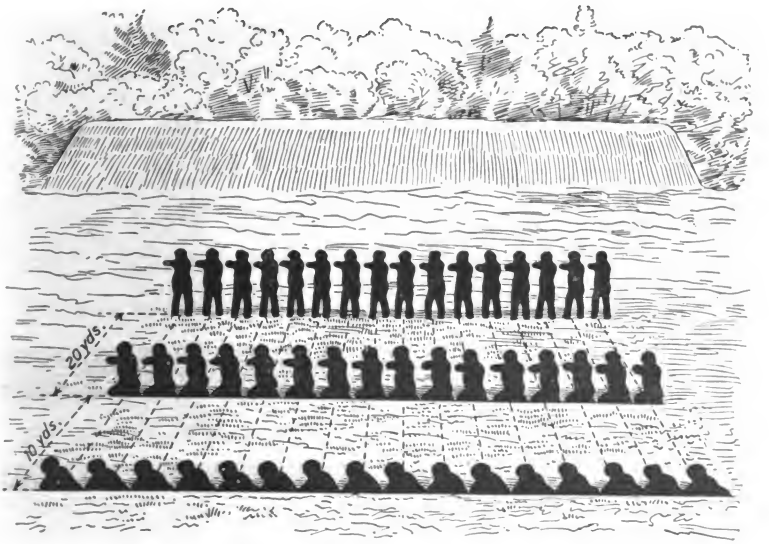
PLATE V.



TARGET L.

PLATE VI.

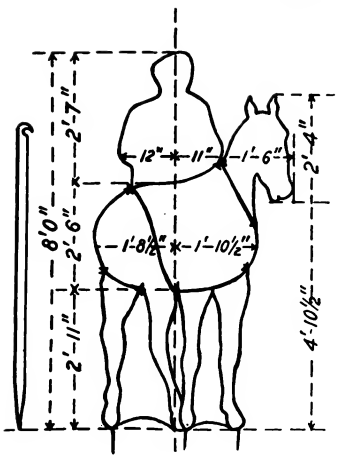


Fig. 1.

Fig. 2.

TARGET M.

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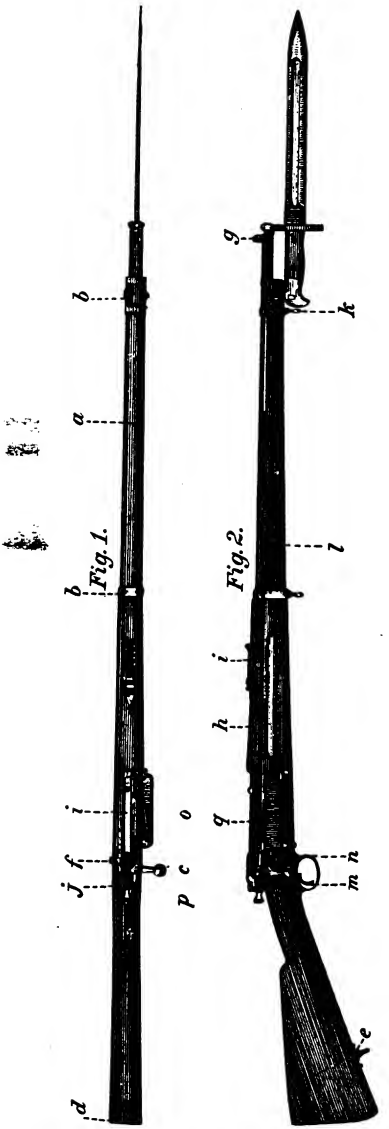

PART II.

RIFLE AND CARBINE.

CHAPTER I.

NOMENCLATURE AND DESCRIPTION.

1. THE RIFLE.—The component parts of the rifle, exclusive of the rear sight, are 87 in number, of which the following are the principal:

Barrel	*a*
Bands (upper and lower)	*b*
Bolt handle	*c*
Butt plate	*d*
Butt swivel	*e*
Cut-off	*f*
Front sight	*g*
Hand guard	*h*
Rear sight	*i*
Safety lock	*j*
Stacking swivel	*k*
Stock	*l*
Trigger	*m*
Trigger guard	*n*
Magazine	*o*
Comb of firing pin	*p*
Bolt	*q*
Extractor	*r*

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The receiver is shown in fig. 3. The hole *A*, called the "well," receives the bolt. The magazine *B* holds five cartridges and is beneath the well.

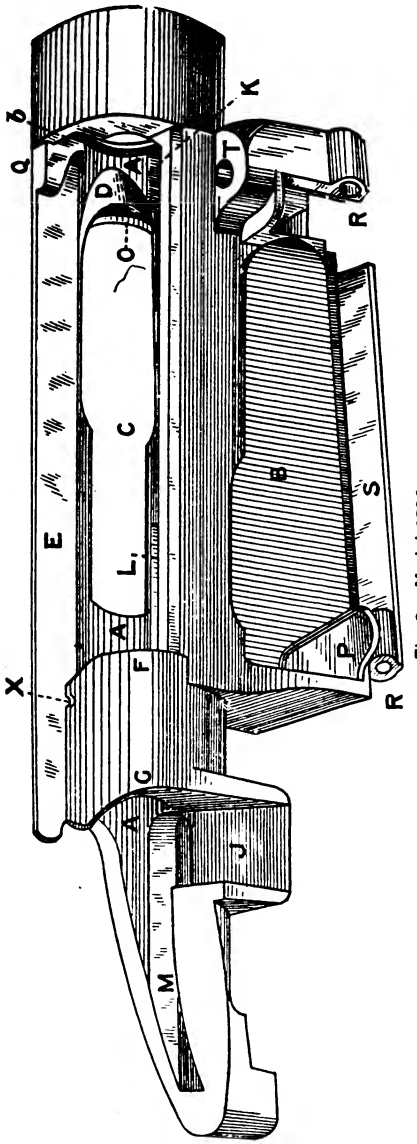

Fig. 3.—Model 1896.

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The bolt is represented in fig. 4, side view; fig. 5, rear view, and fig. 6, front view. It consists of the handle *A*, the outer end of which is undercut to fit the sleeve; the guide rib *C*, which directs the longitudinal motion

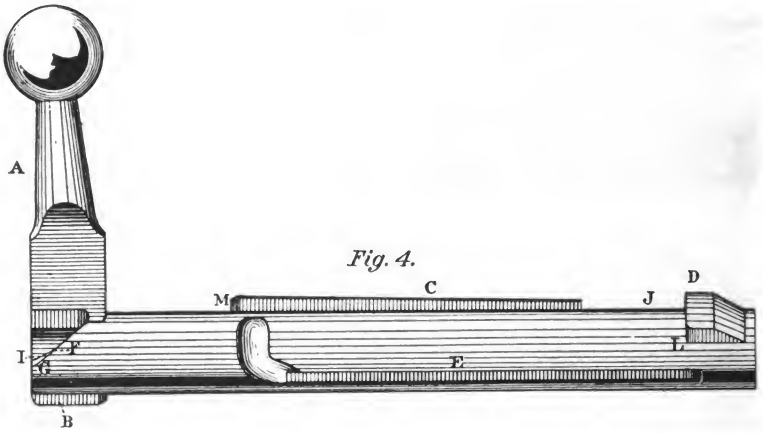

Fig. 4.

of the bolt and extractor; the locking lug *D*, which sustains the shock of discharge; the ejector groove *E*, extending along and partly around the bolt; the cocking cam *F*; the cocking nose notch *G*, and the safety-lock spindle notch *H*.

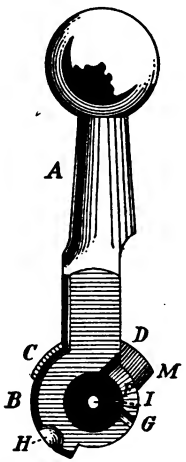

Fig. 5.

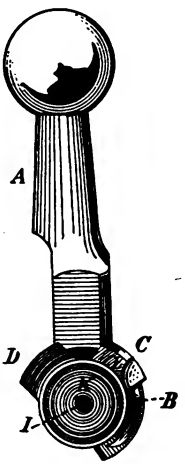

Fig. 6.

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The firing-pin hole *I* is cylindrical except at the front end, where it is contracted to conform to the shape of the front end of the striker; in rear of this contraction is a hole *J* for the escape of gas entering the well from a pierced or leaky primer. The front face *K* of the bolt is countersunk to receive the head of the cartridge case. The corners *L* and *M* are beveled to form cams.

Fig. 7.

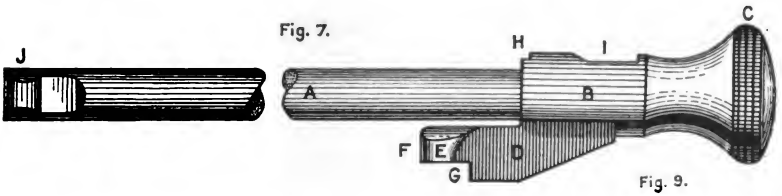

Fig. 8.

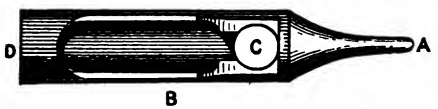

Fig. 9.

The firing pin, fig. 7, consists of the firing-pin rod *A* and of the cocking piece *B*, which are made separately and the former screwed into the latter and riveted in assembling; the length of the rod being so adjusted that, when the front end of the cocking piece bears against the interior shoulder of the sleeve, the striker point will project the proper distance beyond the face of the bolt; other parts are comb *C*, lug *D*, cocking cam *E*, nose *F*, sear notch *G*, safety-lock cam *H*, locking notch *I*, and striker point *J*.

The parts of the striker, fig. 8, are the point *A*; the body *B*, partly cut away to permit the assembling of the firing pin, and the joint hole *C*, by which the striker is secured to the firing pin; its rear end *D* forms the front bearing for the mainspring.

The mainspring is shown in fig. 9.

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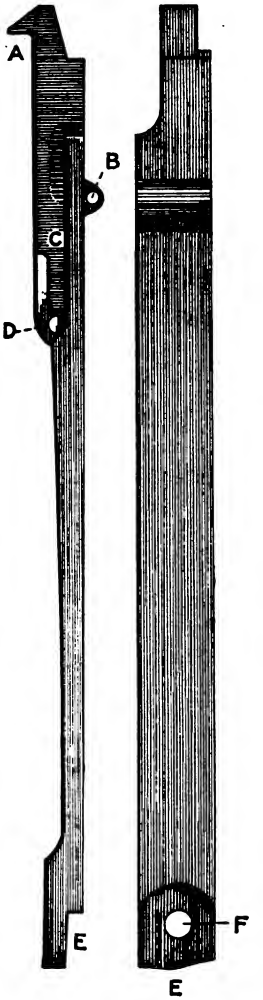
The extractor, fig. 10, has the hook *A*; the extractor-pin hole *B*, the seat *C*, and the stud hole *D*, for the extractor spring; the heel *E*, and the extractor rivet hole *F*.

Fig. 10.



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The extractor pin, fig. 11, is tapering and is driven into its hole in the extractor from the right, and its small end then upset.

The extractor spring, fig. 12, has the stud *S* and the point *P*.

The extractor rivet, fig. 13, holds the extractor in the sleeve.

Fig. 13.

Fig. 12.

Fig. 11.

Fig. 14.

Fig. 15.

The ejector, fig. 14, has the heel *A*, the pin hole *B*, and the point *C*, which, resting on a shoulder in the ejector slot in the receiver, prevents the front end of the ejector from dropping into the magazine.

The ejector pin, fig. 15, on which the ejector is pivoted, has a knob on its left end by which it can easily be withdrawn from the receiver.

Fig. 16.

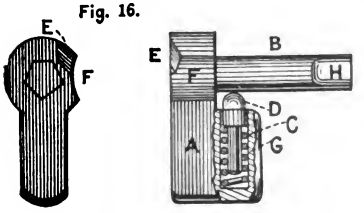

Fig. 17.

Fig. 18.

The safety lock, fig. 16, consists of the thumb piece *A*, spindle *B*, spring *C*, and spring spindle *D*, assembled in manufacture. It has the cam *E*, cocking-piece groove *F*, spring-spindle hole *G*, and bolt-collar notch *H*. The spring is shown in fig. 17, and the spring spindle in fig. 18, the latter, projecting into its groove in the sleeve, under the action of the spring, holds the safety lock in its seat and turned either to the right or left.

The side plate, fig. 19, has the rib *A*, the tenon *B*, the ejector-pin recess *C*, the side-plate screw hole *D*, and the ramp *E*. The side plate forms the

Fig. 19.

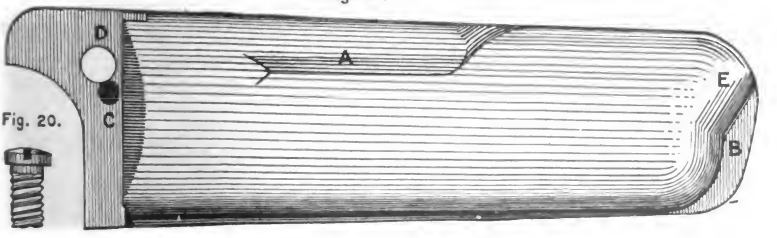

Fig. 20.

left wall of the magazine and is held in its seat in the receiver by the tenon and the side-plate screw, fig. 20.

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The parts of the gate, fig. 21, are the thumb piece *A*, hinge hole *B*, bearing for magazine spring *C*, the recess *D*, which receives the carrier and follower, and the lug *E*, on which is a cam for withdrawing the carrier into the recess.

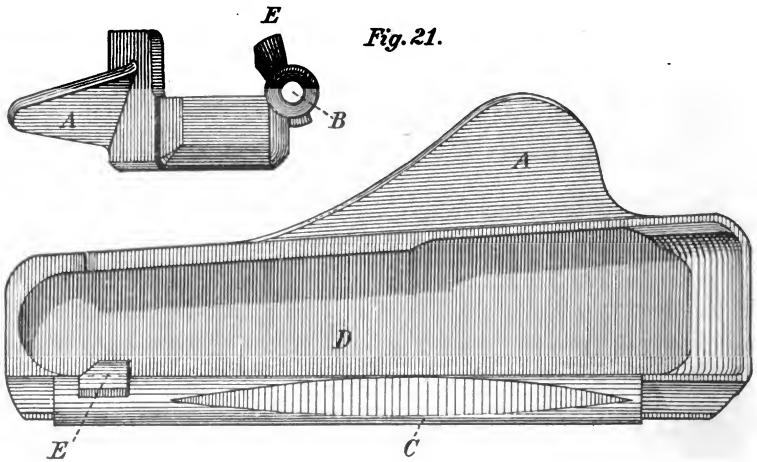

Fig. 21.

Most of the operating parts may be included under the bolt mechanism and the magazine mechanism.

The bolt moves backward and forward and rotates in the well hole of the receiver; it carries a cartridge, either from the magazine or one placed by hand in front of it, into the chamber and supports its head firmly.

The safety lock when turned to the left is inoperative; when turned to the right, it locks the bolt.

The piece may be cocked either by raising the bolt handle until it strikes the sleeve and then immediately turning it down, or by pulling the cocking piece directly to the rear.

In firing, unless the bolt handle is turned fully down against its seat in the receiver, the energy of the mainspring will be expended in closing the bolt, instead of on the primer; this prevents the possibility of a cartridge being fired until the bolt is fully closed.

The opening and closing of the bolt should each be done by one continuous motion.

The machine mechanism includes the gate, carrier, follower, magazine spring, and cut-off.

To charge the magazine, open the gate, insert the cartridges from a clip, or from the hand, then close the gate.

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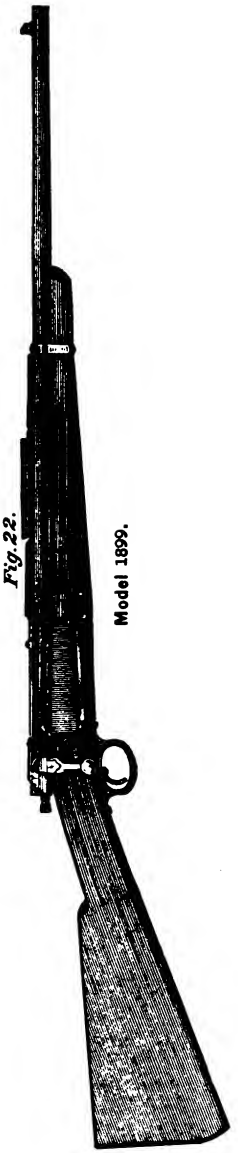

Fig. 22.

The magazine can be charged with the bolt closed or open, with the cut-off turned for magazine or single-loader fire, and if one or more cartridges have been fired, can be filled.

2. THE CARBINE.—The component parts, 61 in number, are the same as in the rifle, with the exception of slight changes in the band, band spring, and stock, fig. 22. The barrel is

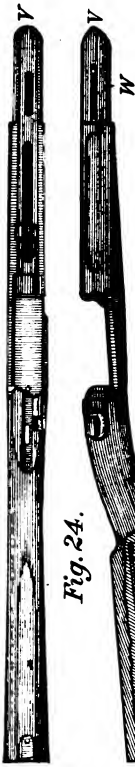

Fig. 23.

Fig. 24.

the same as the rear 22 inches of the barrel of the rifle.

The parts of the stock, shown in fig. 23, top view, and in fig. 24, side view, with section of butt, are the same as in the corresponding

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portion of the rifle stock, except as follows: The shape of the front end or nose *V*, the omission of the butt swivel-plate seat, the butt swivel-plate screw holes, and the lower band-pin hole, and the addition of the band-spring seat and hole *W*.

The principal dimensions and weights of the service magazine rifle and carbine are, in inches and pounds:

	Rifle.	Carbine.
Diameter of bore	0.30	0.30
Length of bore	30	22
Number of grooves	4	4
Twist, uniform, one turn in	10	10
Length of arm complete	49	41
Weight of arm	10⅛	8
Trigger pull	3 to 6½	3 to 6½

The maximum range of the rifle is 4,066 and of the carbine 4,016 yards, fired at an elevation of 44 degrees; time of flight, thirty-four and one-half seconds.

The maximum powder pressure in the chamber of the rifle and carbine is about 38,000 pounds per square inch.

3. APPENDAGES.—The barrack cleaning rod, fig. 25, has the ring handle *A* and the knob *B;* it is made of brass wire; that for the carbine is 8 inches shorter than the one for the rifle, the length of each being such that the ejector will not be struck in cleaning the bore from the muzzle.

Fig. 25.

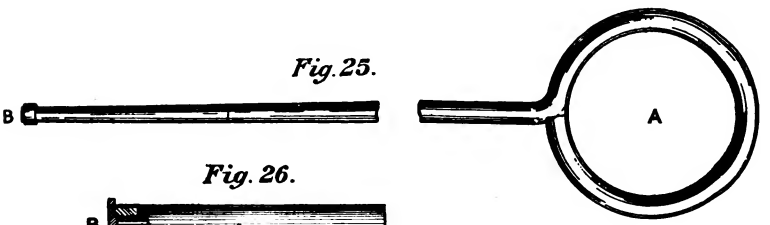

Fig. 26.

The small-arm oiler, fig. 26, consists of the can *A*, top *B*, washer *C*, and wire *D*. The washer is to prevent leaking of the oil. The wire, the point of which is flattened, is to apply oil, a drop or more at a time. The oiler is carried either in the butt of the stock or in a loop of the cartridge belt. The oil is only for lubrication of the working parts.

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The screw-driver, fig. 27, has the large blade *A*, the small blade *B*, and the pin *C*. The large blade should be used for the large butt-plate screw, and for the screws in the upper band, guard, and butt-plate cap spring;

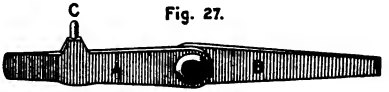
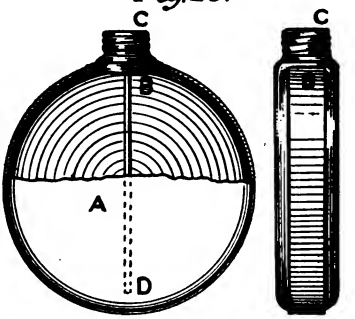


Fig. 27.

the small blade for all other screws, except the rear-sight joint screw, which requires a narrower blade. The pin serves as a drift in removing the butt-plate cap, trigger, and lower band pins.

Fig. 28.



The small-arm pocket oiler is shown in fig. 28. This oiler, having a capacity of two ounces, is as large as can be conveniently carried in the pocket. It is intended for the use of troops serving in the tropics, to provide each man with an additional supply of oil to that contained in the small oiler carried in the butt of the arm. It is made of sheet brass, nickel-plated, with a screw top, to which is attached a wire with spoon end, for removing the oil in drops. The general dimensions are, diameter, 2.75 inches; thickness, 0.6875 inch.

The parts comprise the body *A*, neck *B*, cap *C*, cap washers and spoon *D;* the body, neck, and cap are made of sheet brass 0.02 inch thick. The body is punched and drawn in two cup-shaped parts that overlap when fitted together, and are then soldered. The neck is punched, drawn, rolled for threading, and soldered on the body. The cap is punched, drawn, rolled for threading, and knurled; within the cap are two washers, one of felt to prevent leakage, and one of steel of smaller diameter, which serves to reenforce the top of the cap for riveting the spoon.

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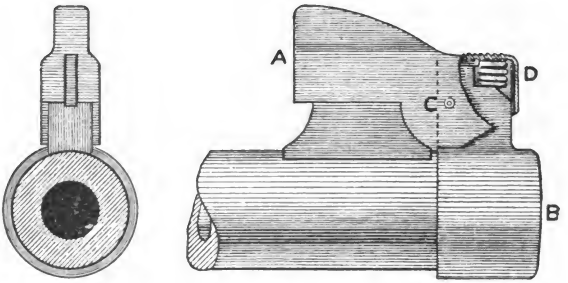
The front sight and muzzle cover, fig. 29, has the front-sight cover *A*, the muzzle cover *B*, the pin *C*, which acts as a hinge, and the spring *D*.

Fig. 29.



To detach from gun, raise the sight cover by pressing on front end with thumb, and draw forward.

Fig. 30.

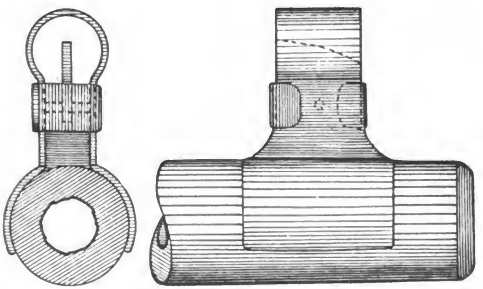


Fig. 30 shows the carbine front-sight cover.

4. ENERGY.—The maximum energy of free recoil of the rifle is 6¾ foot-pounds.

5. DRIFT.—The drift proper of the rifle, it having a right-hand twist, should be to the right, but deductions from experimental firing indicate that the bullet deviates to the left of the line of sight up to about 1,100 yards when it crosses to the right of this line. The drift is shown in the following table:

Range.	Left.	Right.	Range.	Left.	Right.
Yards.	*Inches.*	*Inches.*	*Yards.*	*Inches.*	*Inches.*
100	2.5		1,100	0.3	
200	4.3		1,200		3.5
300	5.9		1,300		7.9
400	7.2		1,400		12.9
500	8.1		1,500		18.5
600	8.5		1,600		24.6
700	8.3		1,700		31.2
800	7.4		1,800		38.1
900	5.8		1,900		45.1
1,000	3.4		2,000		52.1

With the carbine, the drift is always to the right.

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6. PENETRATION.—The penetration found by firing into pine butts constructed so that the bullet passed through alternate sections of pine and air, each 1 inch thick, is, for the rifle, 46 inches at 53 feet from the muzzle; at 50 yards it is 20 inches for rifle, 18 for carbine; at 1,000 yards, 11½ inches for rifle, 11 inches for carbine.

Penetration in sand, loam, etc., at the shorter ranges is always less than at long ranges. Owing to the high velocity of the bullet at short range, the particles of sand, etc., struck do not have time to admit of motion among themselves before the bullets are completely destroyed.

7. The principal dimensions, weights, etc., of the service magazine rifle as compared with the 7-millimeter Mauser and the German Mauser are shown in the following table:

	Service magazine rifle.	Mauser 7-mm. rifle.	German military rifle.
Caliber ..... inches..	0.30	0.275	0.311
Rifling:			
Number of grooves	4	4	4
Depth of grooves ..... inches..	0.004	0.0049	0.0004
Twist, one turn in ..... do....	10	8.66	9.45
Weight of bullet ..... grains..	220	173	226.82
Weight of charge ..... do....	37.6	38.58	41.2
Weight of complete cartridge ..... do....	438.85	385.63	430.24
Initial velocity ..... feet per second..	2,000	2,200	2,145
Remaining velocity at 1,000 yards	901	895	906
Muzzle energy ..... foot-pounds..	1,952	1,857.4	2,315
Striking energy at 1,000 yards ..... do....	396.2	307.4	413
Penetration in white pine at 53 feet ..... inches..	45.8	50.8	.....
Weight of rifle, including bayonet and scabbard ..... pounds..	10.64	10.5	11.54
Weight of rifle, including bayonet, scabbard, and 100 cartridges ..... pounds..	16.91	16.18	17.68
Capacity of magazine ..... rounds..	5	5	5
Maximum ordinate of 1,000-yard trajectory..feet..	25.8	24.47	23.73

CHAPTER II.

CARE AND CLEANING.

8. NECESSITY OF CARE.—Care is required in cleaning the arm after firing, as the residuum of smokeless powder, if not completely removed, corrodes the bore in a short time.

When the practice is concluded, the piece should be at once cleaned, before the fouling has had time to harden.

9. METHOD OF CLEANING.—To clean the barrel, insert in the chamber a cartridge shell, the front end of which has been filled with a wooden plug, and close the bolt; clean the bore with rags saturated with soda water, or, if that is not obtainable, with water; wipe thoroughly dry with clean rags; remove the bolt and cartridge shell; clean and dry the chamber, from the rear, in the same manner; finally oil both chamber and bore

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with cosmoline oil, leaving a light coating. The best method of applying the oil is to rub with a piece of cotton, upon which a few drops of oil have been placed, thereby avoiding the use of an unnecessary amount of oil.

Any part that may appear to move hard can generally be freed by the use of a little oil.

The stock and hand guard may be coated with raw linseed oil and polished by rubbing with the hand.

10. OILING BEFORE FIRING.—Before going to the target ground the rifle should be carefully cleaned. Even if the piece has been put away clean after previous practice, a slightly oiled and then a dry rag should be passed through the bore just before firing; this insures the barrel being always in the same condition for the first shot and eliminates the variations caused by differently cleaned or oiled bores when the effect of the weather upon the amount of heating and fouling is considered in making the allowances in elevation for the following shot.

11. MISSFIRE.—Attention is called to the necessity for pressing the bolt handle well to place before the trigger is pulled, as cases of missfire may frequently be attributed to the fact that the bolt of the rifle was not entirely closed and the handle turned down to its extreme position when the trigger was pulled.

12. CARE IN LOADING.—Failure to properly close the bolt may cause a missfire and is due to two causes: (1) The handle may not be fully pressed down when the piece is loaded; (2) the soldier in pulling the trigger may press slightly under the handle of the bolt and throw it up.

Great care should always be taken by the soldier, both in loading and in handling a loaded rifle, that all possibility of accident may be avoided. If the company has been marched to the target ground, before breaking ranks the chamber will be opened and the magazine examined; if the company is not in ranks, each soldier should do this independently. The same precautions should be observed after passing from one firing point to another.

The rifle should never be loaded except at the firing point, and then only when it is the soldier's turn to fire. In loading, the muzzle should be directed toward the ground or targets. If the firing is delayed either by the display at the targets of the danger signal or from other causes the piece should be locked, and if the delay is at all prolonged the cartridge should be withdrawn. Under no circumstances should the soldier leave the firing point with his rifle loaded nor permit it when loaded to pass out of his hands.

13. CAUTIONS FOR SAFETY.—When it is desired to carry the piece cocked, with a cartridge in the chamber, the bolt mechanism should be secured by turning the safety lock to the right. To obtain positive ejection and to insure the bolt catching the top cartridge in the magazine, when using magazine fire, the bolt must be drawn to the rear in opening it.

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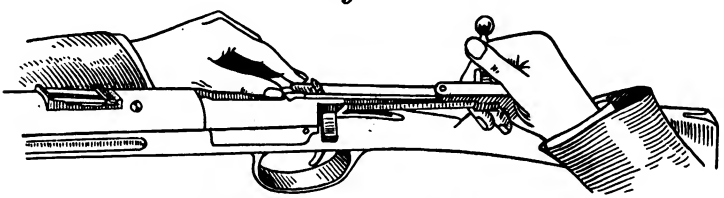
14. JAMS.—If a cartridge is pushed from the magazine partly into the chamber and then the bolt fully drawn to the rear, that cartridge will remain in the well and chamber and a second will rise from the magazine in front of the bolt. If the bolt is again pushed forward, the second cartridge will strike the first and produce a jam. To avoid this, always close the bolt on a cartridge in front of it to insure the action of the extractor and ejector on that cartridge when the bolt is opened.

If a jam occurs, draw the bolt fully to the rear and, with the right hand, remove the first cartridge and close the bolt. If the first cartridge has been pushed into the chamber, draw the bolt to the rear; with the thumb of the right hand push the second cartridge back into the magazine and cut it off; then close the bolt on the first cartridge.

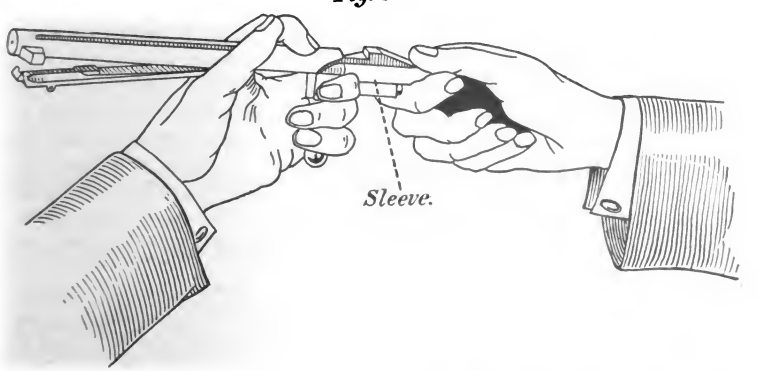
15. TO DISMOUNT BOLT MECHANISM.—Draw the bolt fully to the rear, then place the piece across hollow of left arm.

Fig. 31.



Lift the front end of hook of extractor off bolt with left thumb and at the same time turn the bolt handle to left with right hand (see fig. 31). The bolt can then be drawn from the receiver.

Fig. 32.



Take bolt handle in left hand, back of hand down, bolt upside down. Grasp cocking piece with right hand (fig. 32).

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Slightly draw back cocking piece and turn it toward the operator until the firing pin can be removed from the bolt.

Take firing pin in left hand, extractor underneath, and turn out of the way of striker. Take striker between forefinger and thumb of the right hand, back of thumb down, forefinger curved over point of striker; then, using thumb as fulcrum, bear down gradually with forefinger until point of striker leaves firing pin, releasing the mainspring; remove mainspring from firing pin and latter from sleeve.

16. To Assemble Bolt Mechanism. Observe that the safety lock is turned to the left. Reverse the order of the steps of fifth operation in dismounting.

In putting striker on firing pin, base of striker is placed against loose end of spring. In returning striker to former place, it will probably be found convenient to press point of striker against some surface, which should not be hard enough to injure point of striker.

Grasp the bolt handle in left hand as in third operation in dismounting, and the firing pin in right hand, extractor uppermost. Insert firing-pin bolt.

Grasp handle of bolt with fingers of both hands, bolt nearly vertical and pointed downward, and with both thumbs on the rear of safety lock, push strongly forward and turn to right with thumbs until the arm of the sleeve engages the collar of the bolt.

Grasp the bolt and cocking piece as in third operation for dismounting. Draw back and turn cocking piece from the body until its nose enters the small notch on the rear of the bolt.

Turn bolt to the right and at the same time force extractor into place by pressing strongly with first finger against right side of extractor.

CHAPTER III.

AMMUNITION.

17. Ball Cartridge.—This consists of case, bullet, primer, and charge of smokeless powder.

The case is of brass.

The bullet is lubricated and has a core of lead and tin composition (1 part tin to 25 parts lead) jacketed with cupro-nickel.

The powder is of the nitroglycerin type. The charge varies with the particular lot of powder used, from 34½ to 35½ grains, it being impossible to manufacture powder in lots which will not vary somewhat as to ballistic properties.

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The weight of cartridge complete is from 435 to 442 grains. One thousand cartridges are packed in pasteboard boxes and encased in wood with air-tight zinc lining, weighing 78 pounds.

The standard velocity at 53 feet from the muzzle of this ammunition in the rifle is 1,960 feet per second. This corresponds to a muzzle velocity of about 2,000 feet per second.

The velocity in the case of the carbine is 80 feet per second less than in the case of the rifle.

Service ammunition will not be reloaded by troops, but the empty .30 and .38 caliber shells will be returned to the Frankford Arsenal.

As soon as practicable after firing, decap the shells and throw them into water; if this can be done immediately it will much facilitate their cleaning. To clean the inside wipe it thoroughly with a brush wiper or piece of rag on the end of a wiping stick; then dry and place loosely in the old ammunition boxes.

18. DUMMY CARTRIDGE.—This consists of a shell containing no powder, a primer without the composition, and a service bullet without lubricant. The shell has six grooves running lengthwise and has a round hole drilled in front of the head.

19. BLANK CARTRIDGE.—The blank cartridge consists of the regular service case, hollow paper bullet, and primer. The case is loaded with 5 grains of smokeless blank-fire powder to drive the paper bullet out of the bore, to ignite the powder in the bullet, and to produce a sufficiently loud report in firing.

Five grains of the same smokeless powder are compressed into the interior of the bullet to give the latter the necessary stiffness, and to insure its being broken into fragments when fired.

20. GALLERY-PRACTICE CARTRIDGE.—This cartridge consists of the regular service case, round ball, and the primer.

The cartridge is loaded with 5 grains of black or smokeless powder.

The charge of powder being so small, slight variations in its amount considerably affect the accuracy of the fire; great care should therefore be exercised in loading.

A cannelure in the shell forms a seat for the ball.

The initial velocity of the round ball fired with gallery shell is about 700 feet per second and the penetration about 2 inches in pine at a range of 15 feet.

The shells should be frequently cleaned from fouling, using the brush wiper, and thoroughly cleaned after each day's firing.

The rifle should be cleaned after each score of five shots. The cleaning should preferably be done with the "barrack" (brass) cleaning rod.

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The tools required for reloading these shells, one set to each company, are as follows:

For reloading: Primer, extractor, and inserter; charger, hand reloading; loading die; loading punch; loading anvil; melting ladle; pouring ladle; bullet mold; strainer.

For decapping and cleaning: Brush wiper; primer extractor; brass wiping rod; brass mouthpiece.

21. MULTIBALL CARTRIDGE, CALIBER .30 (Fig. 33).—These cartridges are designed for use in cases where the great range of the service bullet would render its use objectionable on account of the danger to persons and property at considerable distance from the firing point.

The cartridge is composed of the service case charged with a full charge, about 34 grains, of smokeless powder, and two balls held in the neck of the

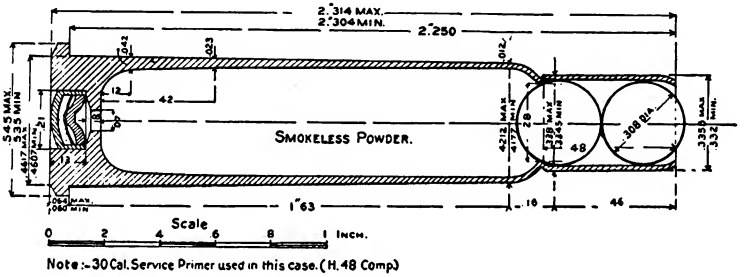

Fig. 33.

case by a cannelure at the lower end and a crimp at the upper. The balls are made of a mixture of lead and tin slightly coated with paraffin. The diameter of the ball is 0.308 inch and the weight 42 grains. The service primer for smokeless powder is used.

The cartridges have sufficient accuracy for effective use at 200 yards, at which range an elevation of 350 yards is required.

At 100 yards or less, fire point-blank.

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PART III.

PRELIMINARY DRILLS FOR RIFLE AND CARBINE.

22. After the soldier has been instructed in the nomenclature of the rifle, the precautions necessary for its care and preservation, and, at least to some slight extent, in the general principles governing the motion of projectiles, he will be thoroughly exercised in the preliminary drills. This branch of the course of instruction comprises sighting drills, position and aiming drills, estimating-distance drills, and gallery practice.

CHAPTER I.

SIGHTING DRILLS.

23. PURPOSE.—It is found, in practice, that the uninstructed recruit is often unable to align the sights of his piece with accuracy upon the mark, unconsciously committing some error which radically affects the aim. To discover and demonstrate this error before firing begins is all-important.

Roughly, it is possible, with the gun in the hands of the recruit, to discover whether an error is being made, by using the instrument called the sight corrector, or by requiring the recruit to aim at the instructor's eye reflected in the mirror. But to determine this error with precision and to demonstrate its nature and amount to the recruit with exactness, a series of systematic exercises is necessary. The gun must be taken out of the hands of the recruit and placed in some form of rest, in which the rifle admits of adjustment in position, in both a vertical and horizontal direction. Such a rest can be obtained by making use of a tripod and a bag of sand, sawdust, grain, or bran.

24. DETAILS OF TRIPOD.—The legs of the tripod should be about 6 feet long, the sand bag resting in the fork made by joining the legs about 8 or 10 inches from the top. The lower ends of the tripod legs may be pointed with iron to prevent the possibility of slipping on the floor of the barracks or gallery. The sand bag should be loosely filled, for if the sand is packed tightly a good bed for the rifle can not be obtained. Each company should be provided with four or five of these tripods and sand bags, in order that, if necessary, the instruction of several squads may be carried on simultaneously.

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25. LENGTH OF DRILLS.—It is essential that the interest of the soldier be obtained and held. This can be best accomplished by limiting the duration of each drill to thirty minutes, and by dividing the detachment into squads of six or eight men each, and as the men become more proficient, by conducting in the different squads, different steps of the gradual instruction, requiring the men to pass in succession from squad to squad as their individual exercises are completed.

26. LINE OF SIGHT.—The instructor will show the men the two points—the middle of the notch of the rear sight and the top of the front sight—which determine the line of sight. They will be informed that these two points must be brought into line with the object aimed at, the rifle inclining neither to the right nor left. The line passing through these three points is the line of sight.

27. FULL SIGHT; FINE SIGHT; HALF SIGHT.—The attention of the soldier will be drawn to the fact that either the entire front sight, or any part of it, can be seen in looking through the notch or aperture in the rear sight. He will be informed that the proper amount of front sight to be taken varies with differences in light. He should also be cautioned that regular results in firing can be obtained only when the same amount of front sight is taken.

PLATE VII.

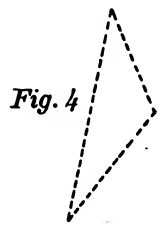

Fig. 4

Fig. 5

Fig. 1

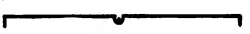

Fig. 2

Fig. 3

To obtain this necessary regularity, either one of three forms of sight should be adopted: full sight (Plate VII, fig. 1), where all the front sight down to the top of the bayonet stud is seen; fine sight (Plate VII, fig. 2), where only the top of the front sight is seen over the bottom of the notch of the rear sight; and half sight (Plate VII, fig. 3), where the top of the front sight is brought on a line with the top of the rear-sight notch. The half sight should be habitually used by the soldier. (The diagram of these sights should be drawn for him on the blackboard.) The fine sight can only be taken with accuracy when the light is strong;

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with the full sight there is more chance of lack of uniformity; the half sight, not requiring as much light as the fine sight, and the horizontal line of the top of the notch of the rear sight affording a good guide for regularity, should by most men be adopted.

The effect of the full sight is to cause a higher point of the object aimed at to be struck than if either of the other kinds of sight had been taken. The fine sight will cause a lower point to be struck.

FIRST TRIPOD EXERCISE.

28. The rifle being placed on the sand-bag rest, and inclined neither to the right nor left, the soldier will be instructed how to bring an object aimed at and the line of sight in the same straight line.

29. For this purpose, the sand-bag rest being about 20 or 30 feet from the barrack wall and the rifle directed at a large sheet of white paper on the wall and about 5 feet from the floor, the instructor will direct a marker to so move a small black disk as to bring its lower edge in the line of sight. The disk, by a pin or tack, will then be attached to the paper.

30. The disk should be so large that it can be easily seen, as it is undesirable that the eye should be in any degree strained. One of the black pasters used in marking out shot holes answers very well; in which case one edge of it can be lightly pasted to the paper.

31. The instructor will then inform the men that he has aimed at the lower edge of the disk, and whether with a full, fine, or half sight; and, calling them up in succession, will direct them to close the left eye and with the right, looking through the rear sight at the object, to notice the relative appearance of the black disk and the points determining the line of sight. This instruction will be given with each variety of sight and with the rear sight adjusted for different distances up to at least 600 yards.

SECOND TRIPOD EXERCISE.

32. The rifle being placed as in the first tripod exercise, and the black disk having been brought, as there explained, into the line of sight, the instructor will call up the men in succession, direct them to examine the sighting of the rifle and to inform him, in a low voice, whether a full, fine, or half sight has been taken. Those men who erroneously judge the kind of sight will be directed to examine it again and their attention brought to the details of the position.

33. The instructor will then slightly alter the position of the rifle and have the disk brought nearly, but not exactly, into the line of sight. The men will then successively examine the sighting and inform the instructor whether the line of sight—taking a full, fine, or half sight—passes to the

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right or left, above or below the lower edge of the disk. This exercise will be repeated for those who incorrectly estimate the direction of the line of sight, and for all with the rear sight adjusted for all different ranges.

34. Soldiers will sometimes be found who do not know how to place their eye in the line of sight; they often look over or along one side of the notch of the rear sight and believe that they are aiming through the notch because they see it at the same time that they do the front sight. This error will probably be made evident by the preceding exercise. Some men also in sighting will look at the front sight and not at the object. As this often occasions a blur, which prevents the object from being distinctly seen and increases both the difficulties and inaccuracies of sighting, it should be corrected.

THIRD TRIPOD EXERCISE.

35. In order to show to the soldier such irregularities in sighting as he may commit, the rifle and sheet of paper on the barrack wall (or the sheet of paper may be advantageously replaced by a blackboard) being placed as in the preceding exercises, the marker is provided with a small rod bearing a disk of white cardboard about 3 inches in diameter, with a black bull's-eye about half an inch in diameter, pierced in the center with a hole just large enough to admit the point of a lead pencil or of a chalk crayon.

36. A soldier is then called to the rifle and by the proper movement of his hands directs the marker to move the disk to the right, left, higher, or lower, until the lower edge of the black center is brought into the line of sight, when he says, "Mark." The marker then records through the hole in its center the position of the disk; the marker lowers the disk, the soldier straightens himself a moment, and then, without moving the rifle, repeats the operation.

37. THE TRIANGLE OF SIGHTING.—This exercise is performed three times, the points thus determined joined by straight lines, and the soldier's attention called to the triangle thus formed. The shape of this triangle and the position of its sides will indicate the nature of the variations made in aiming.

38. ABNORMAL SHAPE—CAUSES.—If the triangle is obtuse-angled, with its sides approaching the vertical (Plate VII, fig. 4), the soldier has not taken a uniform amount of front sight; if the sides of the triangle (Plate VII, fig. 5), are more nearly horizontal, the errors were probably caused by not looking through the middle of the notch of the rear sight, or not over the top of the front sight.

39. If any one of the sides of the triangle is longer than 1 inch, the instructor directs the operation to be repeated, verifying each sight and calling the soldier's attention to the errors which he commits. He will

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explain to him that the sighting gains in regularity as the triangle becomes smaller.

40. If the sides of the triangle are so small as to indicate regularity in sighting, the instructor will place a small black circle so that its lower edge falls in the center of the triangle—the circle should be as small as is compatible with distinct vision when looking through the rifle sights. The instructor will then examine the position of the circle with reference to the line of sight. If its lower edge is in the line of sight, the soldier aims correctly and with uniformity; if not in the line of sight, he aims in a regular manner, but with a constant error.

41. CAUSES OF ERRORS.—If the black circle is directly above its proper position, the soldier has taken, in aiming, too little front sight; or if directly below, too much front sight. If directly to the right or left, the soldier has not sighted through the center of the rear-sight notch and over the top of the front sight. If to the right, he has probably either sighted along the left of the rear-sight notch, or the right side of the front sight, or has committed both of these errors. If the black circle is too far to the left, he has probably sighted along the right of the rear-sight notch, or the left of the front sight, or has committed both of these errors.

If the circle is placed, with reference to its proper position, diagonally above and to the right, the soldier has probably combined the errors which placed it too high and too far to the right. Any other diagonal position would be produced by a similar combination of vertical and horizontal errors.

As the errors thus shown are committed when the rifle is fixed in position while that of the circle or target is altered, their effects will be directly opposite to the changes in the location of a hit in actual fire, occasioned by the same errors, when the target would be fixed and the rifle moved in aiming.

42. After this instruction has been given to one man, the position of the rifle will be slightly changed and the operations repeated with the others in the squad. This instruction will also be given with the rear sight adjusted for different ranges.

43. CANTING THE PIECE.—Before concluding the drills the soldier must be impressed with the necessity of not canting the piece either to the right or left when aiming, but of keeping the sights vertical. He should be taught that if the piece is canted to the right, the bullet will strike to the right and below the point aimed at; and, similarly, if canted to the left, the bullet will strike to the left and low. This can be demonstrated with the gun in the tripod by calling attention of the recruit to the fact that canting the gun to the right carries both the notch of the rear sight and the top of the front sight downward and to the right, but the notch of the

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rear sight, being farther from the axis of the bore, is carried down and to the right a greater distance than is the top of the front sight. The effect, therefore, is similar to the effect of lowering the rear sight and taking windage to the right. This is more easily shown with the rear-sight leaf raised.

If the rifle be inclined to the left, the point struck by the bullet can in the same manner be shown to be below and to the left of the point aimed at.

Inclining the sights therefore diminishes the range and causes deviation of the bullet to the side toward which the inclination is made.

During the course of sighting drill the instructor should show the men how to adjust their sights for different distances, and explain to them the value of the different divisions on the leaf.

CHAPTER II.

POSITION AND AIMING DRILLS.

44. PURPOSE.—These drills are intended to so educate the muscles of arm and body that the piece during the act of aiming shall be held without restraint, and during the operation of firing shall not be deflected from the target by any convulsive or improper movement of the trigger finger, or of the body, arms, or hands. They also establish between the hand and eye such a prompt and intimate connection as will insure that the finger shall act upon the trigger, giving the final pressure at the exact moment when the top of the front sight is seen to be aligned upon and touching the lower edge of the mark.

The fact, though simple, can not be too strongly impressed upon the recruit, that if at the moment the cartridge is discharged the piece is properly supported and correctly aimed, the mark will surely be hit. Then, since almost any intelligent man can be taught to aim correctly and to hold the sights aligned upon the mark with a fair amount of steadiness, it follows that bad shooting must necessarily arise from causes other than bad aiming. Of these causes the principal one is known to be the deviation given to the rifle at the moment of pulling the trigger, due to the fact that the soldier at the moment of firing instead of pulling the trigger jerks it. This convulsive action is largely due to lack of familiarity with the methods of firing, and to a subsequent constrained position of the muscles of the body, arms, and hands, which constrained position it is the purpose of the position and aiming drill to eradicate.

To become a good shot, constant, careful, and patient practice is required. Systematic aiming and pulling the trigger can do much to make a rifleman. The men will be taught to take advantage of every

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opportunity for practicing aiming and pulling the trigger at some definite object. For this purpose the barracks and grounds in the vicinity of the barracks should be furnished with aiming targets, which the men will be encouraged to use at odd moments, as when waiting for a formation or during a rest. At drill the soldier will be cautioned never to pull the trigger without selecting an object and taking careful aim.

Care should be taken by the instructor not to make the aiming and position drills tedious or objectionable. If possible, from five to ten minutes every day should be spent in the practice, and particularly should this be done during and just preceding the practice season. When on the range waiting for his turn to fire, a soldier should use part of his time in aiming and position exercises, aiming at the targets or at objects outside of the range, and he should be made to understand that this practice previous to firing will tend to prevent nervousness and will have a marked effect upon his score.

45. DRILLS; HOW DIVIDED.—These drills are divided into four progressive exercises. The first exercise teaches the position; the second exercise teaches the position and the aim; the third exercise teaches the aim, and manner of pulling the trigger; and the fourth exercise teaches the methods of rapid fire. The exercises at first should be taught by the numbers; when more fully understood, without numbers. The exercise which is being taught should be frequently repeated and made continuous, the instructor prefacing the preparatory command by "Continue the motion" or "At will," and giving the command "Halt" at the conclusion of the exercise, when the soldier will return to the position of "ready." Or, the soldier may be made to repeat the first and second motions by the command "One," "two," the exercise concluding at the command "Halt."

The squad being formed in single rank about 20 feet from the barrack wall, with an interval of one yard between files, the instructor directs the men to take the position of "ready." To correct any tendency to cant the piece, the rear sights will be raised. On the wall opposite each man is placed a small black disk to aim at.

POSITION EXERCISE.

46. The instructor next commands: *Position and aiming drill:* 1. *Position*, 2. EXERCISE.

At the last command, without moving the body, head, or eyes, raise the rifle smartly to the front of the right shoulder to the full extent of the left arm; elbows inclined downward; the barrel nearly horizontal; muzzle slightly depressed, heel of the butt on a line with the top of the shoulder.

(TWO.) Bring the piece smartly against the hollow of the shoulder, without permitting the shoulder to give way, press the rifle against it,

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mainly with the right hand, only slightly with the left; the forefinger of the right hand resting lightly against the trigger; the rifle inclined neither to the right nor left. At the same time bring the left elbow well under the rifle, the right elbow slightly advanced and raised to the height of the shoulder; the head erect; eyes to the front and not looking through the sights.

(THREE.) Resume the position of "ready."

47. REMARKS.—The instructor should especially notice the position of each soldier in this exercise, endeavoring to give to each man an easy and natural position. He should see that the men avoid drawing in the stomach, raising the breast, or bending the small of the back.

The butt of the piece must be pressed firmly, but not too tightly, into the hollow of the shoulder, and not against the muscles of the upper arm. If too tightly held, the pulsations of the body will be communicated to the piece; if too loosely, the recoil will bruise the shoulder. The surface of the butt should rest against the shoulder. If only the heel or toe touches it, the recoil may throw the muzzle down or up, affecting the position of the hit. While both arms are used to press the piece to the shoulder, the left arm should be used to direct the piece and the right forefinger must be left free to pull the trigger.

AIMING EXERCISE.

48. The instructor will first direct the sights to be adjusted for the lowest elevation, and subsequently for the different longer ranges.

The instructor commands: *Position and aiming drill:* 1. *Aiming,* 2. EXERCISE.

At the last command execute the first and second motion of the position exercise.

(TWO.) Bend the head a little to the right; the cheek resting against the stock; the left eye closed; the right eye looking through the notch of the rear sight at a point slightly below the mark, and the top of the front sight aligned upon that point.

(THREE.) Draw a moderately long breath, hold the breath, and slowly raise the rifle with the left hand, being careful not to incline the sight to either side until the line of sight meets the lower edge of the mark; hold the rifle steadily directed on that point for a moment, then, without command and just before the power to hold the rifle steadily is lost, drop the rifle to the position of the first motion of load and resume the breathing.

49. REMARKS.—Some riflemen prefer to extend the left arm (Plates X to XIII). These positions probably give greater control over the rifle when firing in a strong wind or at moving objects. They also possess advantages when a rapid as well as accurate delivery of fire is desired, but in firing

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Fig. 1.—Firing Standing—Body Rest.

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Fig. 2.—Firing Standing—Body Rest.

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Fig. 1.—Firing Standing—Half Arm Extension.

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Fig. 2.—Firing Standing—Half Arm Extension.

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Fig. 1.—Firing Standing—Full Arm Extension.

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Fig. 2.—Firing Standing—Full Arm Extension.

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in double rank the normal position, body rest (Plates VIII and IX), should be used, as it gives greater security to the left arm of the front-rank men.

The eye may be brought to the line of sight either by lowering the head or by raising the shoulder; it is best to combine somewhat these methods; the shoulder to be well raised by raising the right elbow and holding it well to the front and at right angles to the body.

If the shoulder is not raised it will be necessary for the soldier to lower the head to the front in order to bring the eye into the line of sights. Lowering the head too far to the front brings it near the right hand, which grasps the stock. When the gun is discharged this hand is carried by the recoil to the rear, and when the head is in this position may strike against the nose or mouth. This often happens in practice, and as a result of this blow often repeated many men become gun shy, or flinch, or close their eyes at the moment of discharge. Much bad shooting ascribed to other causes is really due to this blow. Raising the right elbow at right angles to the body elevates the right shoulder, and this lifts the piece so that it is no longer necessary to incline the head materially to the front in order to look along the sights.

The length of the soldier's neck determining greatly the exact method of taking the proper position, the instructor will be careful to see that the position is taken without constraint.

50. As changes in the elevation of the rear sight will necessitate a corresponding change in the position of the soldier's head when aiming, the exercise should not be held with the sight adjusted for the longer ranges until the men have been practiced with the sights as they would generally be employed for offhand firing.

51. The soldier must be cautioned that while raising the line of sight to the mark he must fix his eye on the mark and not on the front sight; the latter can then be readily brought into the line joining the rear-sight notch and mark. If this plan be not followed, when firing is held on the range at long distances the mark will generally appear blurred and indistinct. The front sight will always be plainly seen, though the eye is not directed particularly upon it. The soldier will also be cautioned to exercise the utmost care to always take in aiming the same amount of front sight.

52. The rifle must be raised slowly, without jerk, and its motion stopped gradually. In retaining it directed at the mark, care must be taken not to continue the aim after steadiness is lost; this period will probably be found to be short at first, but will quickly lengthen with practice. No effort should be made to prolong it beyond the time that breathing can easily be restrained. Each soldier will determine for himself the proper time for discontinuing the aim.

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53. The men must be cautioned not to draw and retain too long a breath, as a trembling of the body would, in many cases, result.

54. Some riflemen prefer, in aiming, to keep both eyes open, but unless the habit is fixed the soldier should be instructed to close the left eye.

TRIGGER-PULL EXERCISE.

55. The men being placed as for the aiming exercise, the instructor commands: *Aiming and position drills:* 1. *Trigger pull*, 2. EXERCISE.

At the command EXERCISE the soldier will execute the first motion of the aiming exercise. At the command (TWO) the second motion of the aiming exercise.

(THREE.) Draw a moderately long breath, hold the breath, and slowly raise the rifle with the left hand. being careful not to incline the sights to either side, until the lower line of sight is near the lower edge of the mark; contract the trigger finger gradually, slowly and steadily increasing the pressure on the trigger while the aim is being perfected; continue the gradual increase of pressure so that when the aim has become exact the additional pressure required to release the point of the sear can be given almost insensibly and without causing any deflection of the rifle. Continue the aim a moment after the discharge, observe if any change has been made in the direction of the line of sight, and then resume the position of "ready."

56. ACQUAINTANCE WITH TRIGGER PULL.—The value of this exercise lies largely in that by means of it the soldier becomes familiar with the trigger pull of his rifle. Knowing this he is able at any time to judge, within limits, what additional pressure is required for its discharge. By constant repetition of this exercise he should be able finally to pull the trigger to a certain point, beyond which the slightest movement will release the sear. Having pulled the trigger to this point, the aim is corrected and, when true, the additional pressure is applied and the discharge follows.

57. TO CURE FLINCHING.—With some soldiers, however, owing to nervousness and other causes, this seems impossible to accomplish. In such a case, and especially if the soldier seems inclined to flinch at discharge, he should be instructed to pull the trigger so gradually that he will not know when the sear is going to be released. The effect is to discharge the piece before the man can flinch from it, and if while pulling the trigger he is also intent upon the aim, the result will be good.

58. TRIGGER SQUEEZE.—The trigger should be squeezed rather than pulled, the hand being closed upon itself, as a lemon is squeezed, the forefinger sharing in this movement.

If the trigger has been pulled with a jerk instead of a gradual pressure, the muzzle of the rifle will probably be diverted to the right or possibly

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downward at the moment of firing; it is with the object of discovering this error, if made, that the aim is continued after the discharge and the exact point noticed where the rifle is then directed. If at some point other than the mark, every effort should be made by the soldier, during subsequent practice at this exercise, to avoid pulling the trigger with a jerk.

59. CLOSING THE EYE AT DISCHARGE.—This is a form of flinching and is a fault usually contracted by the recruit in his first shooting, as a result of carelessness on the part of the instructor in allowing him to place his head so far forward that his nose at the moment of discharge receives a blow from the thumb of the right hand. Of this blow he is often unconscious, or he does not know how to avoid it, and the consequence is he contracts a confirmed habit of winking at the moment of discharge. But this is not all; the closing of the eye is too often an indication of a convulsive action, a shrinking of the body from, or a movement toward, the blow of recoil, and this movement, occurring at the moment the trigger is pulled, diverts the aim from the target.

This tendency can be cured by a continued course of the third exercise, with special attention to the man's position; and at times when on the range by taking the man's gun and loading, or feigning to load, in such a manner that when the man pulls the trigger he does not know whether or not the piece is loaded.

60. TRIGGER FINGER.—Some riflemen advocate the employment of the second finger upon the trigger; this has the tendency to apparently lessen the amount of force required to discharge the piece, and for men with very long arms or fingers may be the easiest position. The loss of the greater mobility and sensitiveness of the forefinger is, however, a positive disadvantage.

61. OBSERVING THE AIM.—If the trigger is pulled with a jerk, or the man has flinched, the muzzle of the rifle will probably be diverted to the right or downward at the moment of firing; it is for the purpose of discovering if this is done that the aim is continued after the discharge and the point observed on which the sights are then directed. If this point is outside the mark, the trigger has probably been pulled with a jerk, and every effort should be made to correct this fault. If in the instruction practice on the range it can not be overcome, the soldier should be required to stop firing and to practice the third exercise for ten or fifteen minutes. If again in the practice the same fault continues, firing should be suspended for that day.

As in the previous exercises, as soon as the soldier has acquired the details of the movement, he should be practiced in aiming and pulling the trigger, according to this exercise, without the numbers, and also at will.

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As the trigger-pull exercise embraces all that is taught in the aiming exercise, after the soldier has become proficient in the latter, his drill may be confined to the position and trigger-pull exercises. He should be encouraged to go through these exercises frequently at other than drill hours, care being taken that for the trigger-pull exercise he always has some definite object for a mark.

RAPID-FIRE EXERCISE.

62. Being at a "ready," the instructor commands: *Position and aiming drill:* 1. *Rapid fire*, 2. EXERCISE.

At the command EXERCISE the first and second motions of the trigger pull exercise are performed.

(TWO.) At this command the soldier performs the third motion of the trigger-pull exercise, pulling the trigger without disturbing the aim or the position of the piece, but at the same time without undue deliberation. He then, without removing the rifle from the shoulder, holding the piece in position with the left hand, grasps the handle of the bolt with the right hand, rapidly draws back the bolt, closes the chamber, aims, and again pulls the trigger. This movement is repeated until the trigger has been pulled five times, when, without command, the piece is brought back to the position of "ready."

63. PURPOSE.—The object of this exercise is to teach the soldier to shoot quickly and at the same time accurately. Good target shots are not infrequently poor game shots. On the battlefield, as well as on the hunting field, the target is constantly changing, and opportunities to fire with effect are fleeting. It follows that the ability to quickly catch the aim, to pull the trigger promptly, without disturbing the aim, and to get in, in quick succession, several well-directed shots on a vanishing target, is of great value to the soldier.

64. METHODS.—The methods of taking position, of aiming, and of pulling the trigger, taught in the preceding exercises, should be carried out in the rapid-fire exercise, with due attention to all the details taught therein; the details being carried out as prescribed, except that greater promptness is necessary. In order that any tendency on the part of the recruit to slight the movements of aiming and of trigger pull shall be avoided, the rapid-fire exercise will not be taught until the recruit is thoroughly drilled and familiar with the position, aiming, and trigger-pull exercises.

65. TRIGGER PULL.—Particular care should be taken to guard against jerking the trigger. The recruit should be instructed that, with practice, the trigger can be pulled promptly, without in the least diverting the piece. After pulling the trigger the soldier should particularly observe whether or not the aim has been deranged.

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Fig. 1.—Firing Kneeling.

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Fig. 2.—Firing Kneeling.

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66. REPETITION.—If the recruit seems to execute the exercise hurriedly or carelessly, the instructor will require him to repeat it at a slower rate.

67. MANIPULATION OF THE BREECH MECHANISM.—To hold the piece to the shoulder, and at the same time manipulate the breech mechanism with the proper facility, is only learned after much practice. Some riflemen find it easier, in rapid firing, to drop the piece to the first position of load after each shot. While at first trial this method may seem easier, it is believed that, with practice, the advantage of the former method will be apparent, especially for younger men.

POSITION AND AIMING DRILLS, KNEELING.

68. To practice the soldier in the preceding exercises in the kneeling position, the squad being formed in single rank with an interval of one pace between files, arms at an order, the instructor commands: *Kneel:* 1. *Squad,* 2. READY. Executed as prescribed by the drill regulations.

The instructor then directs the men to raise the leaf of the rear sight, and then commands: *Position and aiming drill:* 1. *Position,* 2. EXERCISE, which will be executed as prescribed in paragraph 46, except that at command TWO the soldier will rest the left elbow on the left knee, the point of the elbow in front of the kneecap. The exercise will be further conducted as prescribed in paragraph 46.

For the aiming and trigger-pull exercises, the squad will be placed as above, the bull's-eye being 2½ feet from the floor or ground. The exercises will be conducted as prescribed for the corresponding exercises, standing, with the modification indicated for the position, kneeling.

69. REMARKS.—Frequent rests will be given during practice in these exercises kneeling, as the position, if long continued, becomes constrained and unnecessarily fatigues the soldier.

In raising the rifle to the mark in the second and third exercises, the position of the left hand should not be changed, but the left forearm should be bent toward the body and at the same time the body bent slightly to the rear.

When aiming kneeling there is, from the nature of the position, a tendency to press the butt of the rifle against the upper arm instead of against the hollow of the shoulder; this will necessitate inclining the head considerably to the right, to get the line of sight, and by bringing the rifle so far to the rear will, if the thumb is placed across the stock, cause it to give by the recoil a blow upon the nose or mouth.

These difficulties can be avoided by advancing the right elbow well to the front, at the same time raising it so that the arm is about parallel to the ground. The hollow of the shoulder will then be the natural place for the rifle butt, and the right thumb will be brought too far from the face to strike it in the recoil.

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Some riflemen prefer, by bending the ankle, to rest the instep flat on the ground, the weight of the body coming more on the under part of the heel; this obviates any tendency of the right knee to slip; or by resting the right side of the foot on the ground, toe pointing to the front, to bring the weight of the body on the left side of the foot.

70. CHOICE OF POSITION.—In firing kneeling, the steadiness obtained depends greatly upon the position adopted. The peculiarities of conformation of the individual soldier exert, when firing kneeling, a greater influence than when firing either standing, sitting, or lying down; the instructor should therefore carefully endeavor, noticing the build of each soldier, to place him in the position for which he is best adapted and which will exert the least tension or strain upon the muscles and nerves. It should be remembered, however, that without the rest of the left elbow on the knee, this position possesses no advantage of steadiness over the standing position.

71. KNEELING POSITION; WHEN TAKEN.—The kneeling position can be taken more quickly than either the sitting or the prone position. It is, therefore, the position naturally assumed, when a soldier, who is standing or advancing, has to make a quick shot at a moving or disappearing object, and desires more steadiness than can be obtained standing.

POSITION AND AIMING DRILLS, SITTING DOWN.

72. In many cases, the men, while able to kneel and hold the piece moderately steady, can yet in a sitting position obtain much better results. All should therefore be instructed in aiming sitting down as well as kneeling.

To practice the soldier in the preceding exercises in a sitting position, the squad being formed in single rank, with an interval of one pace between files, the rifle should first be brought to an "order arms;" the instructor then commands: SIT DOWN.

At the command SIT DOWN, make a half face to the right and, assisted by the left hand on the ground, sit down, facing slightly to the right, the left leg directed to the front, right leg inclined toward the right, both heels, but not necessarily the bottom of the feet, on the ground, the right knee slightly higher than the left; body erect, and carried naturally upon the hips; at the same time drop the muzzle of the piece to the front, and to the position of the first motion of load, right hand upon the thigh, just in front of the body, the left hand slightly above but not resting upon the left leg.

The instructor then directs the men as in paragraph 68 to raise the leaf of the rear sight, and then commands: 1. *Position*, 2. EXERCISE, which will be executed as prescribed in paragraph 46, except that at the command TWO the soldier will rest the left elbow on the left knee, the point

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Plate XVI.

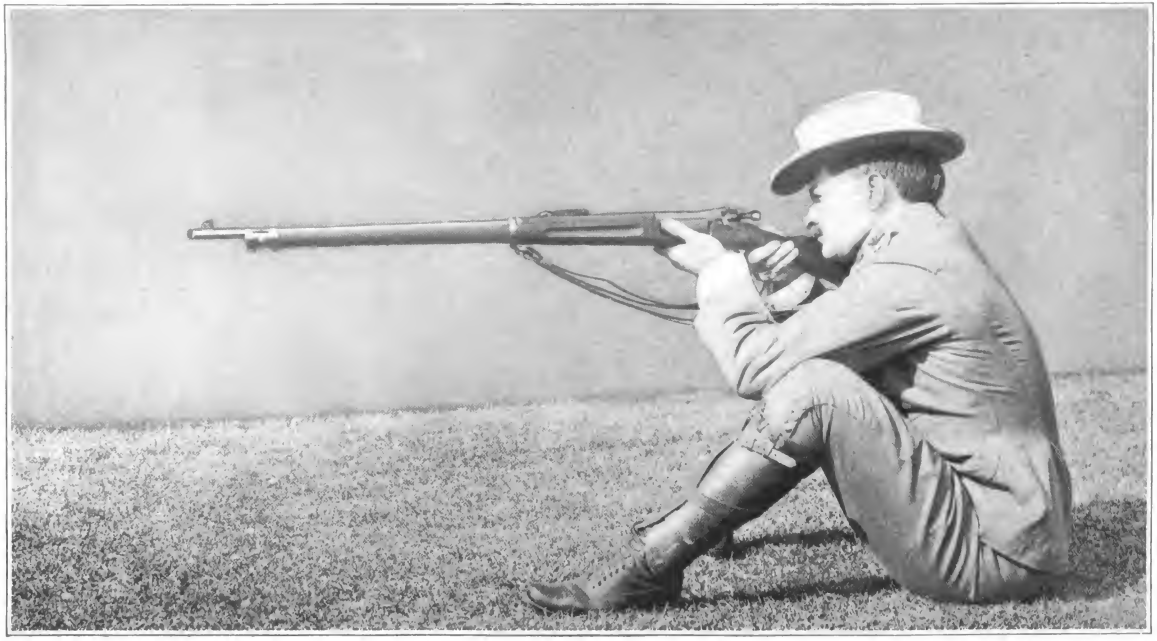

Fig. 1.—Firing Sitting Down.

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PLATE XVII.

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of the elbow in front of the kneecap, and the right elbow against the left or inside of the right knee, at the same time inclining the body from the hip slightly forward. The exercise will be further conducted as prescribed in paragraph 46.

For the aiming and trigger-pull exercises the squad will be placed as above, the bull's-eye being 2½ feet from the floor or ground. The exercises will be conducted as prescribed for the corresponding exercises, standing, with the modifications indicated for the position exercise, sitting down.

On the completion of the exercises, the instructor will command: RISE, when the men rise, face to the front, and resume the "order arms."

73. REMARKS.—If the preceding position is carefully practiced, steadiness is quickly attained. It will be found advantageous to make a slight hole in the ground for the heels, which will prevent any tendency of the foot to slip to the front. The right leg should not be carried so far to the right as not to afford a good support or brace for the right elbow.

This position can be modified, but in the general case, not without impairing the steadiness of the man, by crossing the legs at the ankle, the outside of each foot resting upon the ground, body more erect, and the knees slightly more raised than in the previous position.

In raising the rifle to the mark, the directions of paragraph 69 where applicable should be followed.

POSITION AND AIMING DRILLS, LYING DOWN.

74. From the nature of the position, it is not practicable to execute the preceding exercises according to the method followed when standing or kneeling; instruction will, however, always be given with reference to the position, and to the manner of assuming it, and to aiming and pulling trigger.

For this purpose, the squad being formed as specified in paragraph 45 (and the black disks there mentioned being about 12 inches from the floor), the squad will be brought to an "order arms."

Then being at an order, either standing or kneeling, the instructor commands: LIE DOWN, which will be executed as prescribed in the Drill Regulations; the legs may be spread apart and the toes turned out if found to give a steadier position.

Having taken the position as prescribed in the preceding paragraph, the legs should be inclined well to the left, and either crossed or separated as the soldier prefers or his particular conformation appears to render most desirable, and the body at the same time inclined very slightly to the right.

If care is exercised, a position of steadiness and ease can thus, with practice, be quickly assumed.

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The instructor then directs the men to raise the leaf of the rear sight, and then commands: *Position and aiming drill:* 1. *Trigger pull,* 2. EXERCISE.

At the preparatory command the soldier will cock the piece by drawing back the firing pin.

At the latter command carry the left elbow to the front and slightly to the right; the left hand under the barrel at the balance; weight of the body mainly supported by the left elbow, the right resting lightly on the floor or ground.

(TWO.) Slide the rifle with the right hand through the left hand to the front, until the left hand is a little in front of the trigger guard; at the same time raise the rifle with both hands and press it against the hollow of the shoulder.

(THREE.) Direct the rifle upon the lower edge of the black disk, and carry out the further details of aiming and pulling the trigger as prescribed in paragraph 55.

Then resume the position, lying down.

As soon as the men have acquired with accuracy the details of the position, they will be practiced, without the numbers, aiming and pulling trigger at will; but care will be taken not to unduly prolong the exercise.

To afford the men rest, or on completion of the exercise, the instructor will command: RISE, which is executed as prescribed in the Drill Regulations.

75. REMARKS.—The preceding position for firing lying down possesses, in a greater degree than other positions, the merit of adaptability to changes in the configuration of the ground: it enables the soldier to deliver fire over low breastworks or improvised shelters and rests, and affords him a better view over the ground which separates him from his mark, and a very much greater arc of fire, without altering the position of the body, than can be obtained from any back positions. Back positions are not authorized.

In the lying position, when aiming, the left elbow should be under or slightly to the right of the barrel, the other elbow somewhat to the right, but not so far as to induce any tendency to slip on the floor or ground; the head elevated, the right shoulder well raised, and the rifle pressed firmly against it with both hands.

The greater changes in elevation required in first directing the rifle on the object should be given by altering the position of the left hand under the barrel; the slighter changes only by advancing or withdrawing the shoulder.

The body not yielding to the recoil as when firing standing or kneeling, its force, if the rifle is not properly held, may severely bruise the soldier. It is one of the objects of this exercise to so teach him that this will be

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PLATE XVIII.

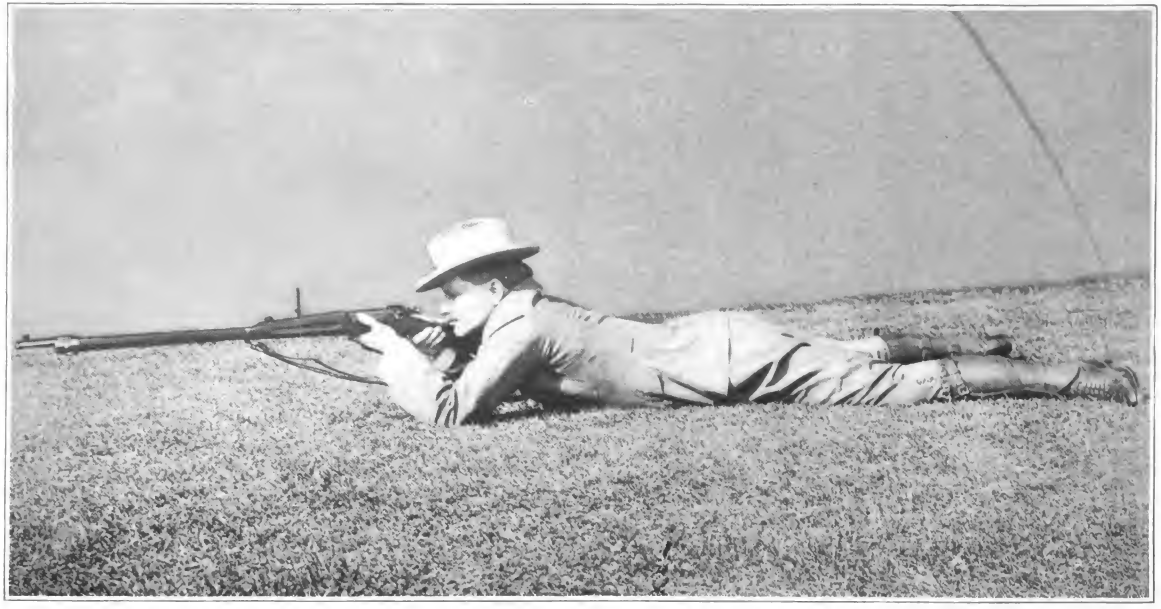

Fig. 1.—Firing Lying Down.

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Fig. 2.—Firing Lying Down.

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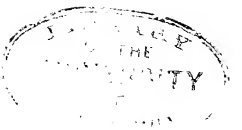

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prevented. Care must be exercised that the butt is not brought against the collar bone. By moving the shoulder slightly to the front or rear, and by moving the right elbow from the body or toward it, each soldier can determine the position in which the shoulder gives to the butt of the rifle the easiest rest. This will probably be the one in which the force of the recoil will be least experienced.

GENERAL REMARKS ON THE PRECEDING DRILLS.

76. The importance of sighting and position and aiming drills can not be too persistently impressed upon the soldier. If these exercises are carefully practiced, the soldier before firing a shot at a target will have learned to correctly aim his piece, to hold his rifle steadily, to pull the trigger properly, and to assume that variety of position best adapted to the particular conformation of his body. This knowledge can not be successfully acquired upon the target ground; at that place the time that can be given to instruction is limited, and should be devoted to the higher branches of the subject; and even if the desired amount of attention could be given to each soldier, yet, from the circumstances of the firing, the determination of his errors can not be readily made, and it is more than likely that the soldier will never discover the reasons for his failures, and will therefore be unable to properly correct them.

Under such conditions, the knowledge that he may have of the many other requisites for good marksmanship can not be utilized to full advantage, and in fact can but in a limited degree compensate for the neglect of these first principles, and for the failure to lay, by assiduously practicing them, the only firm foundation for future proficiency.

77. In conclusion, it may be said that by means of these drills many soldiers can be taught how to shoot without ever having fired a shot. These methods, then, are of supreme importance in time of war, when great numbers of volunteers must be instructed and ammunition for target practice is scarce.

CHAPTER III.

ESTIMATING-DISTANCE DRILL.

78. Its Importance.—The ability to correctly estimate distance is an essential characteristic of the good shot and, therefore, forms an important element in the education of the soldier.

Distances can be estimated by means of range-finding instruments, by eye, by sound, and by trial or volley shots. In a majority of cases, on the battlefield, the distance must be estimated by the eye.

While it is true that in the controlled fire of a company on the battlefield the range will be given by the company officers, it often happens that the

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soldier, acting as a scout, a skirmisher, or an outpost, is placed in a position where it is essential that he shall be able to determine for himself the distance of the enemy in order that his fire may be effective.

It is therefore here made a prerequisite to qualifications as a marksman or sharpshooter, first-class man, and second-class man, that the soldier shall be proficient in estimating distances by the eye.

This course, while it shall be taught and practiced throughout the year, will be systematically taken up by the company during the two weeks immediately preceding range firing. It will not be conducted to the exclusion of other drills and practice.

ESTIMATING DISTANCE BY THE EYE.

79. UNIT OF MEASURE—INSTRUCTION AT SHORT DISTANCE.—To estimate a distance with accuracy, it is necessary to be familiar with the appearance, as to length, of a unit of measure, which can be compared mentally with the distance which is estimated. The most convenient unit of length is 100 yards. To impress upon the soldier the extent of a stretch of 100 yards, two posts 100 yards apart, with short stakes between to mark each 25 yards, should be placed near the barracks, or on the drill ground, and the soldier required to pace off the marked distance several times, counting his steps. He will thus not only learn how many of his steps make a hundred yards, but will become familiar with the appearance of the whole distance and of its fractional parts.

Next a mark distant more than 100 yards will be shown him and he will be required to compare this distance with the 100-yard unit, and to estimate it. Having made this estimate, which will be written down, he will be required to verify its accuracy by pacing it off. In this way the distance between prominent points near the barracks or on the drill ground will be fixed in the mind of the soldier. A few minutes each day should be spent at each company drill in this practice, the soldier often being required to make his estimate by raising his rear-sight leaf and showing it to the instructor. After the first drills the soldier should be required to pace the distance only when the estimate is unusually inaccurate.

80. APPEARANCE OF A MAN AT DIFFERENT DISTANCES.—The soldier should be taught that in judging his distance from an enemy his estimate may be corrected by an observance of the following facts, which will be found true under ordinary conditions with the average eye:

At 30 yards the white of a man's eye is plainly seen, and the eyes themselves up to 80 yards.

At 100 yards all the parts of the body are seen distinctly, slight movements are perceptible, and the minute details of the uniform can be distinguished.

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At 200 yards the outlines of the face are confused and the rows of brass buttons look like stripes.

At 400 yards the face is a mere dot, but all movements of the legs and arms are still distinct.

At 600 yards details can no longer be distinguished, though the files of a squad, if the light is strong, can be counted.

At 800 yards the men in a squad can not always be counted, nor their individual movements distinguished.

At 1,000 yards a line of men resembles a broad belt; the direction of their march can, however, be readily determined.

At 1,200 yards infantry can be distinguished from cavalry.

At 2,000 yards a mounted man usually appears as a mere speck or spot.

To impress these facts upon him, men acting as markers should be posted at various distances, and in different positions, and the soldier questioned as to their appearance and in what respect it differs.

81. INSTRUCTION AT THE LONGER RANGES.—For instructing at longer distances, the standing and kneeling silhouettes used in target practice can be used with advantage. These figures, in groups or singly, are placed at points whose distances from a central point are previously determined. At this central point is a sergeant, detailed to record the estimates. The soldier on arriving at the drill field, or target ground, sees what seems to be a man at varying distances, and in different directions. Being called upon to do so by the sergeant, he makes his estimate of the distance to each point, which is duly recorded and which is published with the true distance after all have made their estimates. This practice can be carried on with much facility at target practice, each man making his estimates while waiting for his turn to shoot.

To avoid the labor of measuring off the longer distances, and to facilitate the placing of silhouettes, two lines of stakes at right angles to each other, the distance between stakes in each line being known, may be prepared. Then the distance from any stake in one line to any stake in the other line can be found by calculation, on the principle that the square of the hypotenuse is equal to the sum of the squares of the two sides. In like manner, if the object is placed on one line at a measured distance from any stake, its distance may be calculated easily from any point on the other line. Thus, also using a straight line of telegraph poles, usually to be found near every post, and a line of stakes, at right angles to it, long ranges can be had with very little trouble.

82. METHODS OF ESTIMATING.—In estimating long distances the following methods are found useful:

1. The soldier may decide that the object can not be more than a certain distance away, nor less than a certain distance; these must be kept within the closest possible limits and the mean of the two taken as the range.

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2. The soldier selects a point which he considers half the whole distance, estimates this and doubles it; or he similarly divides the distance into a certain number of lengths which are familiar to him.

3. The soldier estimates the distance along a parallel line, as a road on one side, having on it well-defined objects.

4. The soldier takes the mean of several estimates made by different persons. This method is not applicable to instruction.

83. APPEARANCE OF MEN, ETC., AT DIFFERENT DISTANCES; HOW MODIFIED BY LIGHT, EARTH'S SURFACE, ETC.—During this instruction, the men should be also taught the effect of the different conditions of light, earth's surface, etc. That objects seem nearer:

1. When the object is in a bright light.
2. When the object is different in color from the background.
3. When looking over water, snow, or
4. A uniform surface without intervening objects, like a wheat field.
5. When looking from a height downward.
6. In the clear atmosphere of high altitudes.

That objects seem more distant—

1. When looking over a depression in the ground.
2. When there is poor light or a fog.
3. When only a small part of the object can be seen.
4. When looking from low ground upward toward higher ground.

84. ESTIMATING DISTANCE BY SOUND.—Sound travels at the rate of about 1,100 feet, or 366 yards, per second. If a gun is fired at a distance a certain time elapses before the sound is heard. If the number of seconds or parts of seconds between the flash and the report be carefully taken and multiplied by 366, the product will be approximately the distance in yards to the gun.

This method will be of use on the battlefield in correcting the estimate of distance to a hostile battery.

85. ESTIMATE OF DISTANCE BY TRIAL SHOTS OR VOLLEYS.—If the ground is so dry and dusty that the fall of the bullets is visible through a glass or with the naked eye, a method of determining the distance is afforded by using a number of trial shots or volleys.

The method of using trial volleys is as follows:

The sights are raised for the estimated range and one volley is fired. If this appears to hit short of the mark an increase of elevation of 100 yards will be used for the next volley. When the object is inclosed between two volleys a mean of the elevation will be adopted as the correct range.

86. PROFICIENCY TEST.—When the above instruction shall in the opinion of the company commander have progressed to such an extent as to enable the soldier to judge the distances with the eye with fair accuracy, he will be tested for proficiency.

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For this test silhouettes will be used, placed upon ground not previously used for this instruction and at distances varying from 500 to 1,000 yards.

Proficiency for the sharpshooter shall consist in making in any five consecutive estimates an average degree of accuracy of 90 per cent.

Similarly for proficiency, marksmen, first-class men, and second-class men are required to make in any five consecutive estimates an average degree of accuracy of 85, 80, and 75 per cent, respectively.

In case the soldier on the first trial does not show the desired proficiency, the tests may be continued so that a reasonable opportunity may be given the soldier to retrieve his failure. They will be conducted at such times as the company commander may desire during the practice season and the period of two weeks immediately preceding the practice season.

Proficiency in estimating distance is necessary to qualification in firing in any class. Failure to attain it lowers the qualification one grade. Thus, if a sharpshooter, as qualified by firing, fails to attain the proficiency required for the sharpshooter in estimating distance, he shall be finally rated as a marksman in the annual report.

No separate report of estimating distances will be required.

CHAPTER IV.

GALLERY PRACTICE.

87. After the soldier has been thoroughly instructed in sighting and in position and aiming drills, he will be exercised in firing at a short range with reduced charges.

88. OBJECT.—As the object of the practice is simply to continue in a different manner the instruction of the preceding exercises, the firing will be held standing, kneeling, sitting, and lying down. The position to be used first is left to the discretion of the instructor.

The cartridge employed for gallery practice and the method to be followed and care necessary to be exercised in reloading and using it are explained in Part II, Chapter III.

89. ALLOWANCE OF AMMUNITION.—The allowance of ammunition for gallery practice is fixed from time to time in general orders from the War Department.

90. BUILDING AND RANGE.—A building 55 or 60 feet long should be selected for the gallery and should be so arranged that there will be a strong light upon the target. The light at the firing point, which need not be quite so bright as at the target, should, if possible, be from overhead, from the rear, or from both sides, as a window at either the right or left hand only will brighten one side of the front sight, leaving the other in shadow, and inaccuracies in aiming will result. Windows between the

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firing point and the target are objectionable as giving cross light and possibly shadows. When a building can not be especially devoted to the purpose, practice can be had in the company quarters or, if sufficiently light, in cavalry stables; or it can be held in the barrack yard, on the piazza, or in any other sheltered place if a regular gallery can not be obtained, although one advantage of gallery practice—its excellence as an aiming drill—will be lessened if the firer, or any portion of the range, is exposed to influences which can cause a deviation of the bullet.

The range will be 50 feet. At this distance the mark made by the bullet may be discerned. The targets used will be either the miniature paper targets X and Y (see "Targets" under "Definitions"), or the iron target with 1-inch bull's-eye.

91. BULLET STOP WITH PAPER TARGETS.—The form of bullet stop depends upon the kind of targets employed. These may be either of paper or iron. With the former the butt should be double, with a space of about 12 or 18 inches between the butts, the front one formed of 2-inch planks, and the second one of 2-inch planks also, but faced with sheet iron—pieces of condemned stoves or circular saws might answer. Between the front and rear faces a box should be placed on the floor to catch the balls after they strike the iron plate. If the sheet iron can not be obtained the space between the butts should be filled with sand, earth, or sawdust.

The paper target and its form of butt, as compared with the iron target, have the disadvantage that the marking is slow, the target is rapidly cut to pieces by the bullets striking so closely together, and the divisions on it are quickly disfigured by the necessary pasters; several targets will therefore be required for a single company practice. The planks just back of the target are soon cut through and must be often replaced, and it is possible that the balls fired with a somewhat diminished charge of powder may rebound the entire length of the gallery.

92. BULLET STOP WITH IRON TARGETS.—If the iron target furnished by the Ordnance Department is used, the target plate should be screwed at the corners to a screen of two thicknesses of 2-inch plank; ammunition boxes filled with earth will answer if the planks can not be obtained. The iron plate will stop by far the greater number of bullets; the wild shots will bury in the wooden screen.

The spatter of the lead ball on the iron target is its single disadvantage, but in firing at a distance of 50 feet the spatter is very slight and most of the balls fall at the bottom of the target, seldom rebounding more than 5 or 10 feet.

The advantages of this target are its endurance and the quickness of marking and readiness with which shot marks can be erased without disfiguring the divisions on the target.

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To prevent any possible danger to the marker from stray bullets or spattering lead, in permanent galleries where a large amount of practice is held a shelter should be constructed which, that it may not darken the target, should be at that side farthest from the principal source of light. The face perpendicular to the butt should meet it about 2 feet from the targets; it need not have a greater thickness than 1 inch, it will be made of boards, and should have a door 1 foot wide and 3 feet long, through which the marker can erase the shot mark on a target placed at the proper height for firing either standing, kneeling, sitting, or lying down. The other face of the shelter, parallel to the butt, should be made of a double thickness of 2-inch plank. The marker should be provided with pots of black and white paint and small brushes at the end of, and perpendicular to, rods about 3 feet long; these will enable him to erase the mark made by the bullet without exposing any portion of his body outside the shelter. For the practice of a single company in the company barracks this shelter will not generally be required; it will suffice for the marker to stand during the firing 4 or 5 yards to the front and to one side of the target, and to erase the shot marks after each score of five shots.

If a large iron plate can be obtained, a most excellent combination of butt and target can be made by using a plate of boiler iron of sufficient size to receive the impact of the wild shots, and so inclined as to deflect the bullets into a long, narrow box placed beneath it upon the floor.

93. SUPPORT FOR PAPER TARGETS.—If paper targets are used, a support should be constructed 10 feet or any other convenient distance in front of the butt upon which will be placed a light target frame, over which is stretched canvas having a paper target pasted upon it. If the accommodations will permit, several of these target frames might be so placed as to allow the simultaneous practice of four or five men, and the practice conducted on the principle laid down in special course B.

As the firing is held at not more than 50 feet, the soldier can easily distinguish the effect of his shot. Marking during a score will not, therefore, be necessary, and as each squad completes its five shots per man, the target frames can be replaced by others ready for firing, and the targets just used prepared for future practice.

94. VALUE OF GALLERY PRACTICE, THE APPLICATION OF POSITION AND AIMING DRILL.—Gallery practice is valuable as being a form of position and aiming drill. Many of the external influences, which on the range affect the firer, being absent, it is possible to apply the details of these drills to actual firing. The soldier should be constantly reminded of the directions given in the sighting and position and aiming drills, and he should particularly be cautioned always to take in aiming the same amount of front sight, and not to pull the trigger with a jerk, but with a gradual pressure, endeavoring at the same time to hold the gun steadily on the

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target and to continue the aim (which the absence of recoil renders easy) until the shot has struck; the effect of his errors, if any, in aiming or holding, or a possible jerking of the trigger, will then be made evident. There being no recoil to induce nervousness or flinching on the part of the firer, the great advantage of this gallery practice lies in the opportunity to teach the trigger pull.

For instruction in firing kneeling, sitting down, or prone, the bull's-eye should be 2½ feet from the floor.

95. POSITION.—Gallery practice partaking principally of the nature of an aiming drill, it is desirable that all men be instructed in firing kneeling, sitting, and lying, as well as in the offhand position, without regard to the relative proficiency they attain, and practice should be about equally divided between these methods; the men in all cases adopting, whether firing standing, kneeling, sitting, or lying down, the particular variety of that position which seems to be best adapted to their individual peculiarities.

96. SCORES.—Gallery practice will be conducted in scores of five shots, the number of such scores to be fired by any man at a single practice being determined by the company commander.

No reports of the results of the firing will be required, but a record of it should be kept in the company for the instruction and guidance of the soldier.

97. INTEREST.—The attention of the men to pointing and aiming drills soon flags, while gallery practice arouses and retains their interest; it also awakens the spirit of emulation in the soldier, without which any considerable degree of progress can not be made. To the instructor it affords the best opportunity for correcting the positions and errors of the men; and if carefully conducted the soldier who afterwards practices on the range with full charges will, as soon as he becomes accustomed to the recoil, find it a simple matter to make scores which before seemed for him impossible.

98. MATCHES.—Matches in gallery firing between the men, particularly the recruits, and between teams of the same or different companies, should be promoted and encouraged. While increasing the interest of the men in their practice, they at the same time afford experience in the conditions of competitive firing.

99. RETURN TO GALLERY.—If men at any time fail at any particular range when firing with full charges, and in the opinion of the instructor their failure can be ascribed to other causes than erroneous judgment or the light or wind, they should be brought back to the gallery, and by practice in the positions and with the sights as they had just been used on the range, their errors should be determined and corrected.

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PART IV.

RIFLE AND CARBINE RANGE PRACTICE.

100. This practice includes the instruction of the soldier in firing with service rifle and carbine, in slow fire, timed fire, rapid fire, and skirmish fire; also the company practice in collective fire. The general scheme, arranged according to courses and classes of fire, without regard to chronological sequence, is set forth in the following synopsis:

- Rifle and carbine range practice.
  - Individual range firing.
    - Regular courses.
      - Marksman's course.
        - Instruction practice — Slow fire. Rapid fire. Skirmish fire.
        - Record practice — Slow fire. Rapid fire. Skirmish fire.
      - Sharpshooter's course.
        - Instruction practice — Slow fire. Rapid fire.
        - Record practice — Slow fire. Rapid fire.
      - Expert rifleman's test.
        - Instruction practice — No instruction practice.
        - Record practice — Slow fire. Timed fire. Skirmish fire.
    - Special courses.
      - Special course A.
        - Instruction practice — Slow fire. Timed fire.
        - Record practice — Slow fire. Timed fire.
      - Special course B.
        - Instruction practice — Slow fire. Timed fire.
        - Record practice — Slow fire. Timed fire.
      - Special course C.
        - Marksman's record course — Slow fire.
        - Sharpshooter's record course — Slow fire. Timed fire. Skirmish fire.
        - Expert rifleman's record course — Slow fire.
  - Collective range firing
    - Record practice — Volley fire.
    - Record practice — Fire at will.

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CHAPTER I.

GENERAL DESCRIPTION; GENERAL REGULATIONS; PIT REGULATIONS; INSTRUCTIONS AND SUGGESTIONS.

GENERAL DESCRIPTION.

101. SCHEME.—The scheme of range practice is progressive in character. It requires all soldiers to first pass through a period of educational firing, more or less extended according to individual requirements, called "instruction practice;" second, through a short period of test firing, alike for all, called "record practice." The combination of these two classes of practice constitutes the subdivision of range practice called "the marksman's course."

The scores made by the soldier in record practice. marksman's course (together with the per cent made in the estimating-distance test), determine his fitness to progress to more difficult and longer range shooting. If he has fallen short of the totals required to qualify him as a marksman, he will do no more individual range practice that season, but will be qualified according to the scores and estimates that he has made.

If, however, he has attained the record for the marksman, he progresses to the sharpshooter's course, where, after a period of instruction practice, he follows the prescribed record practice, and if successful in making the requisite record for sharpshooter in that course (and the required per cent in the estimating-distance test), he is qualified as a sharpshooter. He is then entitled to a trial in the next higher course of firing, called the "expert rifleman's test." This differs from the courses that precede it in that there is no instruction practice. It is, as its name implies, a test, and upon the result of this test depends the soldier's eligibility to the grade of "expert rifleman."

The expert rifleman's test generally closes the individual range practice for the season. Preceding it, the course of practice for the company as a unit will, if practicable, have been completed. This is called the "collective fire" of the company; it is not necessarily preceded by instruction practice and is prescribed partly for the purpose of establishing a means of comparing the results of volley fire and fire at will.

102. SUPPLEMENTARY COURSE.—In addition to the range practice described below, pursued in the regular practice season of three months, a supplementary course of instruction of one month's duration is prescribed for the benefit of recruits and others. This supplementary practice is partly for the purpose of preventing an accumulation for an extended period of recruits totally uninstructed in target firing. It generally takes place, as nearly as practicable, midway between two annual seasons.

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103. SPECIAL COURSES.—Special courses A and B are prescribed for practice during the supplementary season where climatic conditions prevent the prosecution of the full course, and will be pursued also instead of the regular course at posts unprovided with complete ranges. Special course C is prescribed for the use of the organized militia of the United States.

GENERAL REGULATIONS.

104. ALLOWANCE OF AMMUNITION.—The prescribed course presumes an allowance of ammuntion as follows:

Rifle and carbine service ammunition for those following the regular course, 400 rounds annually, per man; for those following special course A or B, 150 rounds annually per man; for monthly contests at posts, not to exceed 30 rounds per contest, per each man engaged, this ammunition to be issued and expended by the post ordnance officer upon the order of the post commander.

105. TARGET YEAR AND PRACTICE SEASON.—The target year, being the period for which reports are rendered and which must include the practice season, will commence January 1 and terminate December 31. In the Philippine Islands these dates will be varied as required.

The practice season will be divided into two periods; one of three consecutive months, called the regular season, and the other of one month, called the supplementary season. The months constituting the practice season will be designated by the department commanders. During the four months designated as practice season, firing on the range will be prosecuted in such a manner that, while the firing shall take place on the most favorable days and under the most favorable circumstances, the usual drills and instruction of troops will not be suspended more than is actually necessary.

In the regular season the prescribed course will be carried to completion, all the officers and enlisted men who are required to fire taking part. In the supplementary season recruits who have joined since the close of the regular season, all who did not fire, and all who qualified only as third-class men during the season will fire. Recruits will take the regular instruction practice, marksman's course, if practicable, or otherwise, special course A or B. For third-class men firing will be in instruction practice only, and at the ranges and under the classes of fire in which they failed to qualify in the regular season.

The main object of the supplementary season is to insure against the continued presence of a large number of recruits who have had no instruction in firing. It should be as nearly midway between the annual regular seasons as practicable.

The regular season will terminate on or before October 31.

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106. WHO WILL FIRE.—One object of target practice being to disseminate among the people the knowledge taught as far as practicable, and it being therefore desirable that all men leaving the company shall have received some instruction, all enlisted men of the line present at the post during any part of the practice season will, if practicable, take the prescribed course of rifle and carbine practice so far as the period of their service permits.

Company and troop officers of less than fifteen years' commissioned or commissioned and enlisted service in the Regular Army will follow the regular course.

The authority of the department commander will be necessary to excuse officers or men from firing who are required by these regulations to take the course.

Officers and enlisted men not included above will be permitted, but not required, to fire.

In the Philippine Islands rifle and carbine firing may be varied as the division commander may direct.

107. RESTRICTIONS AS TO THE ARM.—The object of all instruction, of which range firing merely forms one of the final steps, is to increase the soldier's accuracy of fire with the small arm as he will take it into action. It is therefore requisite that his practice should be conducted with the rifle, carbine, or pistol exactly as it is supplied by the department having charge of the fabrication of arms, except that the sights may be blackened if desired. The use in regular practice of additional appliances, such as temporary shades for the sights, detachable spirit levels, orthoptic eyepieces, etc., which in the field would practically never be applied to the rifle or used in aiming, and would only make the soldier dependent upon conditions unlike those which obtain in battle, will not be used in regular practice. In the regular practice the firing must be held "in the open" and not from any sheds or shelters. The troops in each organization will use, in small-arms practice, the weapon with which they are armed. Infantry and artillery (except field batteries) will, therefore, practice with the rifle; cavalry with the carbine and pistol, and field artillery with pistol. Officers and enlisted men of the staff corps who may practice will use the rifle.

Small arms issued by the Ordnance Department for test and report may be used in target practice, but in all such cases the fact will be noted in the reports of such practice.

108. USE OF GUN SLING.—The use of the gun sling will be permitted at all ranges, but neither end will be detached from the piece.

109. USE OF RESTS.—No rest for the rifle or carbine, or for any part of the body, will be allowed, except as prescribed in the kneeling and standing positions, or as authorized for the sitting position. Within the

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limitations of these regulations the positions which the soldier can take with the greatest ease and steadiness should be adopted.

110. PRACTICE OF CASUALS.—All officers and enlisted men not required to fire, but who, nevertheless, do so, will be attached to organizations for practice, but will be reported separately.

111. INSTRUCTION PRACTICE.—In all instruction practice the instructor, having required the soldier to fire the minimum prescribed, proceeds with such further instruction and firing as each particular case demands. The allowance of ammunition is controlled by the rate per man and the number of men, but the distribution of this allowance is a matter for the instructor to regulate. For soldiers whom the instructor knows to be excellent shots of great experience the minimum of two scores in instruction practice will frequently be sufficient, and in each such case the saving of ammunition may be well used in the instruction of the poor and inexperienced shots. The instructor, therefore, should carefully consider his material before commencing the season's work; he should, in a general way, plan the apportionment of his time and ammunition in accordance with the needs of the individuals of his command, so far as known, and he should then proceed to work out this plan in detail, devoting much attention, time, and ammunition to the undeveloped recruit and never losing sight of the principal object of target practice, i. e., the development, not of a minimum of extraordinary marksmen, but of a maximum of good, intelligent, reliable shots.

An illustration will indicate the scope given the instructor in the question of ammunition. The maximum number of rounds used by the soldier following all the courses, instruction and record practice, and participating in the collective fire of his company, but firing the minimum in all instruction practice, is 360. His allowance is 400; hence, a saving of 40 rounds to be distributed wherever, in the judgment of the instructor, it will be most beneficial.

In short, instruction practice should be in fact what it is in name, and the methods employed, the time consumed, and the ammunition expended are, within the requirements of regulations, optional with the instructor.

Although not prescribed, it will be found that, in some instances, instruction practice may well be commenced with some firing at 100 yards.

112. RECORD PRACTICE.—Record practice differs from instruction practice in that, while the soldier continues to receive instruction therefrom, this is not the only object sought. The main purpose is twofold: First, to afford the soldier an object lesson of his progress, thus sustaining and stimulating his interest; second, to obtain a record by means of which comparisons may be instituted between individuals, organizations, and posts, and published for the information of the Army.

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From the nature of record practice, its rules must be fixed and applicable to all alike; these rules must be observed with unswerving impartiality, scores must be recorded with the strictest accuracy, and the work in the pit must be conducted with the greatest efficiency.

113. ORDER OF PROCEDURE.—The practice season opens with instruction practice, marksman's course. This is carried to completion for each soldier, through slow, rapid, and skirmish fire, before proceeding to record practice for that soldier. When the instruction practice, marksman's course, is completed, the soldier proceeds to record practice, same course, and follows this practice to completion, in the order prescribed in the table. If the soldier qualifies as a marksman in the marksman's course, he now proceeds with instruction practice, sharpshooter's course, which, when finished, is followed by record practice, same course. For any individual, in any course, record practice will never take place on the same day with any part of instruction practice.

The sharpshooter's course will be followed ordinarily by collective fire and the latter by the expert rifleman's test.

When a soldier completes his instruction practice in any course he may begin record practice in that course without waiting for others less advanced. While engaged in record practice at any range, he will do no other firing at that range. Sighting shots form no part of the score and are not recorded as such; they are not included in the computation of the time limit. Where sighting shots are prescribed the soldier has no option, but must fire all prescribed. A record-practice score for any individual once begun at a range will be continued to completion at that range without interruption, and if at a range where sighting shots are prescribed, the practice will begin with the first sighting shot. A record-practice run, skirmish fire, in any individual case, will be completed on the same day on which it is begun.

Except in the expert rifleman's test, the several scores or runs comprising record practice at any range may be fired on different days, in such cases sighting shots, at ranges where required, preceding each score.

Men who have finished the course and qualified as sharpshooters may be permitted extra practice with a view to preparation for the expert rifleman's test. Such extra practice will not be permitted to interfere with the progress of the regular practice, and will never take place on the same day as the expert rifleman's test.

114. INSTRUCTION SHOTS.—Shots fired by an officer or an enlisted man for the purpose of instruction will be permitted only in instruction practice.

115. SUPERVISION.—The practice of the company will always be superintended by an officer.

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116. SCORING.—The permanent record of the scores, from which only the classification will be made, will be kept at each firing point by a noncommissioned officer, who will be assigned, if practicable, to a firing point where his own company is not practicing.

All entries in the company target record will be made in ink, or with indelible pencil; and no corrections or alterations made except by the officer directing the practice, who will then append thereto his initials.

Where practice is conducted simultaneously on two or more targets by detachments of the same company, and it is impracticable for a single scorer to enter all the shots as signaled upon the company target record, the scorers may record the value of the shots in ink, or with indelible pencil, in books or memorandum sheets prepared for that purpose. This memorandum, upon the completion of the firing, will be copied into the company target record, under the supervision of one of the company officers.

117. SCORING, SLOW FIRE.—The scorer, as each shot is signaled, will announce the name of the firer and the value of the shot, and will record it on the page of the company target record assigned to that soldier.

118. SCORING, TIMED AND RAPID FIRE.—In timed and rapid fire the scorer does not announce the name of the firer after each shot is signaled. As each hit on the target is signaled it is announced and recorded; the number of misses, if any, is then announced, and finally the name of the firer with his total score is announced and the latter recorded.

119. SCORING, SKIRMISH AND COLLECTIVE FIRE.—In the skirmish and volley fire, and the fire at will, scores will be kept in the target pit, reported to the officer conducting the practice, and by him copied upon the company target record.

120. RANGE OFFICERS.—At stations where the range is provided with several targets, and practice usually held simultaneously by two or more companies, and successively by others, a range officer will be appointed.

The range officer will be charged with the care and police of the range, and with the necessary repairs to the targets, shelters, butts, or firing points; in carrying out these duties he should be assisted by a noncommissioned officer and by the labor of such fatigue parties as may be required.

He will make timely estimates for material and labor to place the range in thorough condition for the target season, and all necessary repairs will be made under his direction and the supervision of the post commander.

He will be responsible for the accurate measuring of the range and the correct location of the different firing points; that the targets are at all times free from special marks that might afford undue assistance in aiming, and that the figure targets employed for skirmish and volley fire are correctly placed. He will be responsible for the arrangements and the

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efficiency of the personnel at the butts and will make frequent inspections thereof.

He will see that on the days selected for practice the streamers are hoisted on the different poles and that the range is otherwise prepared for firing.

The range officer will not exercise any supervision over the details of the instruction of the companies practicing on the range; he will, however, see that all necessary precautions are taken for the safety of the markers and any spectators that may be present.

When ranges are not provided with butts and the surroundings are such that persons or animals might attempt to cross the ground in the rear of the targets, the range officer, before firing is begun, should post lookouts, whose duty it will be to warn passers-by that firing is in progress and to prevent any attempts to cross the line of fire. Whenever the lookouts can not prevent the line of fire being crossed, they should caution the markers to withdraw the targets and to display the danger signal until the ground is again clear.

PIT REGULATIONS.

121. NONCOMMISSIONED OFFICER IN CHARGE OF PIT.—A competent noncommissioned officer, with such assistants as the post commander deems necessary, will be detailed permanently in charge of arrangements at the butts. He will be under the direction of the range officer. He will notify the target details each day before the firing commences and will be responsible for their efficiency and discipline. In the preparation of silhouette targets he will see that the paper is trimmed so as not to project beyond the steel frame.

122. TARGET DETAIL.—For individual firing the detail for marking for each target will consist of two privates belonging to the company firing at that target and one noncommissioned officer, always selected if practicable from some other company. The noncommissioned officer will be held responsible that order is kept at his target and should be familiar with the regulations governing the markers and with the method of marking. Upon arriving at the target the noncommissioned officer in charge thereof will see that the signal flag, marking staves and disks, and pasters are provided and in good order; and, if necessary, will notify the noncommissioned officer in charge of the pit of any deficiencies. He will then display the danger signal, and, examining the target carefully, will place pasters over any old shot holes, or put on a new paper target if necessary. Upon completion of the firing he will cause the target to be withdrawn from the firing position and will then make such disposition of the danger signal and marking disks as may have been directed by the range officer. He will also report to the noncommissioned officer in charge of

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the pit such repairs as that target or its implements may require for a succeeding practice.

If it should become necessary before the completion of the firing for the marker to leave, or for other persons to enter a target pit not provided with a continuous shelter and a covered approach, the target should first be turned or withdrawn from the firing position and the danger signal displayed. After the signal "Cease firing" has been sounded, or if there is no musician present at the firing point, after a few seconds' delay, the target pit may be entered or left, the target turned back to the firing position, the danger signal removed, and firing resumed.

123. MARKING.—When a post is garrisoned by a single company, or where it is impossible to detail noncommissioned officers of other companies to supervise the marking and scoring, these duties may be performed by noncommissioned officers of the firing company. In this case new paper targets should be used for each firing, and upon its completion the company commander, or one of his lieutenants, should count the number of hits in each division of the target and compare the totals with the recorded scores. If the value of the hits as signaled is materially different from that obtained by the examination of the target, especially if the former record is much greater, all scores as recorded for that day's firing will be canceled and not considered in the soldier's classification. Such corrective measures should also be taken as will insure accuracy on the part of the markers in future firings. As in some cases the markers may inadvertently make errors in signaling the hits, whenever an examination of the target gives results very closely agreeing with the recorded scores, the record should be permitted to stand, but the markers cautioned to exercise greater care in the future.

Any shot cutting the edge of the figure or bull's-eye will be signaled and recorded as a hit in the figure or bull's-eye, and as the limiting line of each division of the target is the outer edge of the line separating it from the exterior division, whenever this line is touched by the shot, it will be signaled and recorded as a hit in the higher division.

As the rivalry between the companies might, in exceptional cases, in individual target practice, offer a temptation for incorrect marking and exaggerated scores, the officer conducting the practice will take the utmost pains to prevent such inaccuracies and to secure a correct record of the result of the firing. He should, in this endeavor, receive from the post commander every encouragement and assistance.

124. MARKING, SLOW FIRE.—In slow fire, as each shot is fired, the noncommissioned officer indicates to one of the markers the value and position of the hit, if any is made, and supervises this marker while he

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signals (being careful to place the center of the disk over the shot hole) the result of the shot to the firing point as follows:

If a bull's-eye, with a white disk.

If a center, with a red disk.

If an inner, with a black and white disk.

If an outer, with a black disk.

If a ricochet, by displaying the ricochet flag, and if the target is hit, by placing over the shot hole the appropriate disk. Ricochet flags are white flags with red centers similar to those used in signaling, the size depending on the distance.

If a miss, by waving the danger flag several times across the front of the target.

If the markers are certain on which side of the target the miss is made, the flag will also be waved on that side.

After the result of the shot has been signaled, the other marker, if a direct or ricochet hit has been made, will reverse the target and place the proper paster over the shot hole.

An alternative method of marking at mid and long ranges consists of the use of a large disk and a shot mark, the former to indicate the value only, the latter the location, of the hit. The disk is exhibited at one side of the target so as not to interfere with the aim of the succeeding firer; the shot mark is attached to the target over the shot hole, and remains in view of the soldier while the succeeding firer is firing his shot. With this method of marking, a single target is preferable to the usual double target.

125. MARKING, TIMED FIRE.—In timed fire for all arms the complete score is fired before the result is marked and signaled. As this fire is not at disappearing targets, the time is regulated at the firing point with a watch or sandglass. The signaling is done with the usual disks.

126. MARKING, RAPID FIRE.—In rapid fire, with rifle or carbine, at the disappearing target, the noncommissioned officer in charge of the target, at the signal from the firing point, commands "Ready." As soon as all is in readiness to run up the target, he commands "Up." Exactly twenty seconds after the target is in position he commands "Down," having preceded this command two or three seconds by the warning command "Ready." The target must be exposed and withdrawn as quickly as possible.

The number and value of the hits are signaled with the usual disks in the usual manner after the score has been fixed, the number of misses being carefully indicated by the flag as a check on the accuracy of the number of hits signaled.

When the single-rolling, or Cushing, target is used the method of marking will be varied to meet the conditions.

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In rapid fire with the pistol at the disappearing target the manipulation of the target is as in rapid fire with the rifle or carbine, except that the target remains exposed ten seconds instead of twenty.

127. MARKING SKIRMISH FIRE AND COLLECTIVE FIRE.—In these classes of fire the marking is superintended by an officer belonging to an organization other than that firing.

That the marking may be quickly performed and the targets soon made ready for further firing several officers should be detailed to examine the targets and keep the record of the hits. They can divide between them the examination of the different targets. The privates detailed to paste the shot marks may belong to the company firing if not required to form part of the firing line.

The result of the volley fire at any range may be communicated before the commencement of the fire at will at that range.

In the firing at the figure targets there is danger, if bullets strike the steel frames, that some pasters may be shaken off the targets by the impact without its coming to the knowledge of the markers. In all cases, therefore, where any paper silhouette is to be used for a second firing a cross will be marked with a red pencil over each shot hole before covering it with a paster.

After the targets have been examined and pasted, a final examination will always be made by the officer or officers to see that all shot holes are properly marked and pasted.

INSTRUCTIONS AND SUGGESTIONS.

128. PRESERVATION OF ORDER.—The officer in command of the firing party, besides affording his men such instruction as they may require, will be responsible that those waiting their turn to fire preserve order, and that all observe the general regulations of the range, and take such precautions as may be necessary to guard against accident.

129. WEATHER CONDITIONS.—While it is desirable that the soldier should be instructed in firing under varying conditions of weather, yet practice, particularly in the first weeks of the target season, should not be held on days when the conditions are so unfavorable as to render uncertain the causes of the errors that may be made.

130. PRACTICE HOURS.—Such an hour of the day will generally be selected for the regular practice as, considering the direction of the range with reference to the sun, the prevailing wind, etc., seems most favorable. An hour, however, will be chosen when the men are not fatigued from the performance of labor or from drill, and when sufficient time can be obtained for the deliberate completion of the firing before they are required for other duty. If this is not practicable, the practice will be continued at some other time and until all the men have fired.

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Post commanders may so arrange the hours of attendance at target practice of the company musicians and cooks, the chief baker of the post, soldiers detailed as school teachers, etc., as to enable them to follow the prescribed course with the least inconvenience to the command.

131. CALLING SHOTS.—It is advised that as each shot is fired the soldier should carefully notice the exact point at which the rifle was aimed and announce, before the shot is signaled, where he believes it to have struck. If he correctly calls the shot, it is probable that he has made the proper allowances, and no changes, except those in the elevation which may be necessitated by the heating and fouling of the barrel, will be required. If, however, the soldier calls the shot incorrectly, he should determine what changes are required, and, with the approval of the instructor, make the proper corrections.

132. DIAGRAM TARGETS.—If the men find it difficult to call the estimated location of their hit, a diagram of the target, drawn to a convenient scale, may be provided, on which the soldier can designate the point where he thinks his shot struck. By using two of these diagrams, one for each man of the pair firing, and pins with different colored heads, this method can be advantageously extended to graphically recording the estimated and true position of each shot of the score, thus exhibiting to the soldier, in the plainest manner, the nature of his errors.

133. DELIBERATION IN AIM.—In slow fire each soldier should endeavor to aim and fire with deliberation. If, when aiming, he feels unsteady and not confident of his shot, he should, without firing, lower his rifle and only resume the aim after a moment's rest.

134. CORRECTING ERRORS.—The instructor should watch attentively the position of each soldier. He should, however, be careful not to check a man for any error when he is aiming, as it would probably have the effect of rendering him nervous and unsteady; but after the soldier has fired should inform him of his errors and caution him how to avoid them when firing the next shot.

135. INDULGENCES.—To encourage the men, such special indulgences as the post or company commanders may deem practicable should be given to the best shots or to those who show the most marked improvement.

136. IMPORTANCE OF PRELIMINARY DRILLS.—Before any practice on the range is commenced, it is most essential that the soldier, by careful attention to the sighting and position and aiming drills, and by gallery practice, should have become thoroughly at ease in the standing, kneeling, sitting, and lying positions, and should have discovered and mastered the difficulties of steady holding and accurate aiming in each of these positions. At least a month of this instruction will be required for the recruit, and for those soldiers who in the preceding year's practice failed to qualify higher than the second class.

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As the lack of continuous practice may have somewhat impaired the proficiency of even the expert shot, preliminary drills, especially that part covered by the gallery practice, will be found decidedly advantageous even in some cases for the sharpshooter or marksman.

If for the majority of the company this instruction has been carefully conducted, a great step has been taken in the soldier's education as a rifle shot, and he is properly prepared for range firing with the attendant recoil and for the study of the physical phenomena which affect the course of the bullet.

The remarks with reference to the various positions and the details of position and aiming drills, given in the chapter on that subject, are commended to the careful consideration of the soldier. Some men find it difficult to obtain a comfortable kneeling position; in such cases it will be advisable after firing each shot either to rise or to sit on the ground for a moment's rest before again firing.

137. NEGLECT OF PRELIMINARY DRILLS.—If, however, these rudiments of the subject have been neglected, a great amount of ammunition will be wasted before the soldier is enabled to ascertain (if he ever does) the nature of the errors he generally commits, and before he succeeds in eradicating them. As a result, much of the practice season will be lost and considerable ammunition will be expended without any increase in the soldier's accuracy of fire, and, therefore, without much increasing his possible efficiency in battle.

138. ADVANCING THE SOLDIERS.—Although the men may have been properly grounded, the change of conditions, from the gallery to the range, will generally impair the success of the earlier firings, and will, therefore, make it necessary, whenever resuming range firing at the commencement of the practice season, to begin at the shortest range, and only as the men at that range complete the scores prescribed for their season's practice, advance them to the longer distances. Many of the difficulties of range firing increase as the distance of the soldier from the target becomes greater.

139. SUSTAINING THE INTEREST.—In determining the proper method of conducting the further education of the soldier, the influence of his interest in his work (without which but little can be accomplished), of his ambition to attain a higher class in marksmanship, and of the natural emulation between the men, should not be neglected; for these are in reality the most potent factors, and by utilizing them as far as possible very great results can be accomplished and a high degree of efficiency attained.

140. GRADUATION OF REAR SIGHT.—The graduations on the rear sights of the rifle and carbine are determined from actual firing at the Springfield Armory under average conditions of weather. The elevations thus

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marked for different distances will not be found to answer, without allowances, when firing is held at other places, but will vary with the height of the range above the sea level; and on the same range, with variations in atmospheric conditions, the peculiarities of shooting of different guns and the different ways of sighting, holding, and pulling trigger on the part of the soldier.

The elevation required for different distances at any particular military post, and for any fixed conditions of the weather, must be determined by experience.

The sights upon military firearms do not permit very delicate adjustment, and it is impossible to anticipate the particular errors in each shot which may occur in consequence of the variations in the rifle and ammunition.

On the magazine arms the notches on the rear sight are centrally located, without corrections for drift.

141. SHORT-RANGE AIMING.—The trajectories of the rifle and carbine are so flat that the sights have not been arranged for any elevation less than 300 yards; within that range the gun will therefore shoot high, and should consequently be aimed below the bull's-eye.

Experience shows that the invariable tendency of troops in battle is to aim too high, and that this tendency is greatly increased as proximity to the enemy is attained. To obtain the most useful effect from the soldier's fire in action, the habit of aiming low should be formed; that is, of aiming below the bull's-eye.

142. LONG-RANGE AIMING.—In the practice at long ranges, the principal difficulties lie in the necessity for correctly estimating the force and direction of the wind and in allowing for these and the increased drift in selecting the point of aim; also in the necessity for greater refinements in the estimate of the elevations required. It will therefore be necessary to study attentively these factors and to aim with even greater care than at the shorter ranges.

143. PRECAUTIONS AGAINST ACCIDENTS.—Great care should always be taken by the soldier, both in loading and in handling a loaded rifle, that all possibility of accident may be avoided. If the company has been marched to the target ground, before breaking ranks the chamber will be opened and the magazine examined; if the company is not in ranks each soldier should do this independently. The same precautions should be observed after passing from one firing point to another.

144. MISSFIRES.—Cases of missfire of cartridges may frequently be attributed to the fact that the bolt of the rifle was not entirely closed and the handle turned down to its extreme position when the trigger was pulled. Attention is called to the necessity for pressing the bolt handle

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well to place before the trigger is pulled, in order to avoid the chance of missfire.

145. CHANGING POSITIONS.—After the selection of a position has once been made it should not be abandoned simply because the soldier sees better scores made by others from different positions, but should be adhered to long enough to give it a thorough trial. Nothing injures firing, especially at the longer ranges, more than perpetual changes of position; each change affects at least the appearance of the sights or the touch upon the trigger; it may also alter the relative tension or relaxation of the muscles, and until the soldier has had the time and practice required for a knowledge of these altered conditions and their effects, his average shooting will usually be poor.

If frequent changes of position are detrimental, those made while firing a single score are still more so, and under such circumstances the soldier should not be surprised by the poorness of his record.

146. CLEANING THE PIECE.—Before going to the target ground the rifle should be carefully cleaned.

147. TRIGGER SNAPPING.—After the soldier has adjusted the sight, and while he is waiting to be called to the firing point, he should take the position he proposes to assume in firing, and aim and pull trigger several times. This will serve to steady him and also to accustom his eye to the light and its effect upon the sights.

148. DETAILS OF AIMING AND FIRING.—In slow fire, the estimated adjustment of the sight having been made and the soldier called to the firing point, he should take the position he generally adopts, load, examine again the adjustment of his sights, and then (noticing that he is looking at the proper target) aim carefully and steadily at the lower edge of the bull's-eye.

Great care must be taken that the rifle is not inclined to either side (which can be best avoided, when firing at the longer ranges, by observing whether the leaf is perpendicular), and that the amount of front sight taken is the same as that usually seen by the soldier. But slight changes in this latter particular produce considerable effect upon the target.

Care must also be taken that the front sight is centered in the rear-sight notch, or that when looking through the notch the same amount of light is seen on either side of the front sight.

In aiming, the advice and directions given in the sighting and in the position and aiming drills should be followed. It is especially advantageous to aim at the lower edge of the bull's-eye, endeavoring to cover no portion of it. If this plan is not followed it is difficult to determine just how much of it is covered, and at the moment of discharge it is even possible for the rifle to be directed above it without the soldier being aware

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of his error. This method of aiming also possesses the advantage of tending to impress upon the soldier the necessity for directing his fire just below the object he desires to hit, and thus, in action, adding to the chances for a direct hit those offered by the ricochet.

In slow fire, if the soldier finds that he is unsteady when about to fire, the piece should be lowered from the aim, more than once if necessary, and at each time a moment's rest taken; for if the first effort to get a good sight is unduly prolonged, and he fires while unsteady, not only may that shot be poor, but nothing is learned from it upon which corrections for the succeeding shots may be founded.

When firing prone, the stability of the position permitting great deliberation, the soldier, after the general direction of the piece has been given, should glance at the wind vane or flags, or, if the range is not provided with those accessories, at any surrounding trees or high grass, and observe whether any sudden change has occurred in the direction and force of the wind. If any changes are noticed, the aim should be discontinued and corrections made accordingly.

If no changes are deemed necessary, the aim is completed and the piece fired, particular care being taken to observe the point aimed at at the moment of discharge, the soldier always naming to himself the value and position of the expected hit.

Immediately after firing, the soldier should withdraw the bolt, and especially if firing at the longer ranges; observe at the same time whether the atmospheric conditions are still those for which the sight was adjusted. By this time the shot will have been signaled. If the correct allowances were made, practice can be continued without modification.

If the hit is not placed as anticipated, the point of aim should be altered in the direction and amount necessary to correct the error.

To make this method of correcting for the succeeding shot of any value, the atmospheric conditions should remain unchanged, and, what is of great importance, the soldier's judgment of his aim at the moment of discharge should have been correct. The greater steadiness of the lying position will then give to this method its principal value at the mid and long ranges. If the soldier is habitually uncertain where he holds at the instant of firing, accuracy becomes mainly a matter of chance, and the sights first adopted will perhaps answer the purpose during the remainder of the score as well as any others that he might happen to select.

149. FINDING THE TARGET.—If a shot misses the target and no dust or other indication of the nature of the error is noticed, the direction of the miss must be inferred from the conditions of the weather. If a strong side wind was blowing, the miss was more than likely to either the right or left; if there is but little wind, if the day is either exceedingly dry or very damp, very bright or very dark, or if there is much mirage, or a strong

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wind in the direction of the plane of fire, the elevation assumed was probably incorrect.

In the first case, if the soldier from long firing has discovered the usual nature of his errors in estimating the deviating effect of the wind, he will be able to judge on which side of the target the miss was probably made. If this knowledge has not been obtained, it will generally be safest to assume that a sufficient allowance was not made, and that the shot passed the target on the side opposite to the wind. The point of aim should be changed toward the wind a distance corresponding to three-fourths of the width of the target. If the direction of the error has been correctly judged, this will change on the next shot, if firing at short or mid ranges, a very close miss into a 4, well out on the opposite side of the target, or a miss of 1 or 2 feet into a 5 or a 4 on the same side of the target. At long ranges a very close miss would be changed to a 3 on the opposite side of the target, misses of 1 or 2 feet to 4's or 5's. If firing at 600 yards, a miss of 4 feet, if at 1,000 yards one of 8 feet, would be brought on the target.

After correcting in this manner, if the target is not found on the second shot and the soldier is still convinced that his errors are horizontal rather than vertical, he was probably mistaken as to the side on which the misses were made. If, for instance, he has been moving the point of aim to the right, it should now be moved to the left and to a distance beyond the position originally selected for the first shot equal to the correction made for the second shot.

If the target is again missed, make the correction in the direction first chosen, but with double the amount first selected. If still a miss, then apply this double correction in the opposite direction. If, after these different trials, no hit is obtained, abandon the theory of lateral errors and alter the elevations.

Whenever making changes in the elevation, after missing on the first shot, and there is nothing to indicate whether the shot was too high or too low, it is generally safest to assume the former to be the case, as a low shot will often raise a dust visible from the firing point, while a shot over the target might not.

If firing at 500 or 600 yards, when very great errors in the elevation are improbable, it should be decreased sufficiently to lower the second shot about half the height of the target; but if firing at 800 or 1,000 yards, the greater chances for error make it more advisable to change the elevation enough to produce a fall in the bullet equal to about three-fourths of the height of the target.

If on the second shot the target is not hit, increase the elevation above its first allowance as much as it was previously lowered. If a miss still

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results, lower again, but to double the amount first selected, and if a hit is not yet made, increase the original elevation by this latter amount.

It will often be advisable to combine the horizontal and vertical methods of feeling for the target, alternating in successive shots the direction in which the allowances are made. The soldier must not temporize or make these corrections in a feeble manner; if unhesitatingly applied, and with their full value, the target will generally be quickly found; whereas if only slight changes are made, a number of shots, especially at the long ranges, may be fired without the nature of the error being discovered, or a hit obtained.

150. KEEPING THE TARGET.—If the target is hit on the first shot and the allowances then made result in a 5 or close 4 for the second shot, the sights should not be changed during the remainder of the score; but the variations which may occur in the conditions affecting the elevations or wind allowances, unless they are very considerable, should be allowed for by altering the place on the target upon which the rifle is held.

This method, while generally advantageous, is especially so when firing in a puffy wind or in an alternately bright and dark light, as the fixed sight, a certain point of aim, and the conditions existing at the second shot, all form a valuable basis for comparison with the subsequent conditions.

Whenever firing in a puffy wind, or in one subject to frequent changes in direction, the soldier should, as far as possible, endeavor to fire his shots under similar conditions, waiting a short period whenever necessary until they become the same as those in which previous shots were fired. If this can be done he will be able, without corrections in the sight, to hold on the figure throughout the score.

151. EFFECT OF TEMPERATURE.—After the proper adjustment of the sight and the point of aim have been determined upon, it will rarely happen while firing a single, or even several consecutive scores, that such changes can occur in the temperature as to make further correction necessary. If the first shot has been fired from a clean, cool gun, the subsequent fouling and heating of the barrel and the different vibrations of the latter, which are caused by the heating, will generally make necessary a slight increase in elevation for the second shot, and often an additional increase for the third shot. This should be followed, in some cases where a number of shots are fired without cleaning or without any considerable interval, by a slight lowering of the elevation after additional shots.

152. EFFECT OF LIGHT.—The effect of clouds or bright sunshine is mainly noticed in the elevations. On bright, hot days there is greater probability of local currents, produced by the differently heated ground, which, unless the soldier is thoroughly familiar with the topography of the range, will cause unaccountable deflections. On these days, also, there is a possibility of portions of the range being in shade; that particular ground will

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therefore be cooler, and consequently the adjacent air (being of a greater density) will offer increased resistance to the bullet. Under these conditions there is greater probability of inaccurate shooting.

When the day is overcast, the light being of a dull gray and evenly diffused, it is more likely that the air over the whole range will be of a uniform temperature and free from local eddies. Such weather is the most favorable for accurate practice.

When the light is alternately bright and then shaded by clouds, the difficulties confronting the soldier are much increased. These changes of light, besides affecting the conditions which cause a deflection of the bullet, also have a considerable influence upon the manner of aiming.

153. CHANGING LIGHTS.—Changes in the brightness of the light seem to affect the aiming of different soldiers in various ways; suggestions which might prove of value in many cases might therefore prove erroneous in others. It is, however, generally found, if shooting on a cloudy day and the sun appears and lights up the target, that the elevation should be diminished, while if shooting on a bright day and the sun become obscured, the elevation should be increased.

In cases where the light is frequently changing it is essential that the soldier should prolong his aim until his eyes become accustomed to the altered conditions and until he becomes assured that his observation is correct.

154. MIRAGE.—When shooting on hot, cloudless days, especially if over low, level ground, or over ground not covered with grass, the target will appear to be raised higher than it really is, the bull's-eye to be elongated vertically, and its outlines and those of the target to have a wavy and ill-defined appearance.

This mirage is more noticeable as the firer is closer to the ground; it will then be more frequently observed by the soldier when firing lying than when firing either kneeling or standing. As the true position of the target is below the apparent, the elevation should, if the mirage is considerable, be decreased.

This can be illustrated and the extent of its effect determined if, early in the morning, before the mirage is noticeable, a telescope is directed at the target and so adjusted that the two lower corners of the target just touch the lower arc of the circumference of the field of view; the telescope should then be clamped in position. Later in the day, before commencing firing, examine the position of the target in the field of view; if there is much mirage, the target will appear considerably raised, and in some cases also laterally displaced; the extent of this apparent movement will be shown by comparing the second with the first position of the target, and should be measured by the eye, using the entire target or the bull's-eye as a unit of measure; the elevations which would otherwise be selected by the

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soldier should then be decreased by the amounts corresponding to these displacements.

155. CONDITIONS MOST FAVORABLE.—When all the influences affecting the elevations and the accuracy of fire are considered, it follows that the best results will generally be obtained on warm, damp days, with the sky uniformly overcast, and that on these days less elevations and smaller changes will be required. The reverse of these effects obtains on a hot, bright day.

156. CHANGING SIGHTS.—With very many soldiers, even the most expert shots, some slight motion of the piece takes place between the time when they intended to pull the trigger and the instant when the object is accomplished. If the soldier does not notice this motion, he ascribes to extraneous influences his error, and corrects accordingly, whereas it was in reality, the holding that was in fault, and perhaps the adjustment of the sights and selection of the point of aim correctly made. For this reason it is often unadvisable to change the sights if a single shot goes wild, especially if the preceding shots were good.

157. VALUE OF AVERAGE PROFICIENCY.—It may be recognized as an established fact that any body of men, where all have received careful instruction and have reached a fair state of proficiency in the use of their weapons, will be of more value upon the battlefield than if a few of their number had become even more expert, but the instruction of the remainder neglected in order to reach this result.

It is therefore incumbent upon the company commander to endeavor to make good average shots of all his men, devoting even more time to the poor than to the expert shot.

In instructing the soldier, the company commander should appeal to his common sense, explaining in detail and showing him in all cases the reasons for the methods he prescribes. The individual intelligence of the soldier will thus be brought into play, and his value in the dispersed order of fighting which is made necessary to such a great extent by the power of the present small arm will be greatly increased.

CHAPTER II.

GENERAL REMARKS; MARKSMAN'S COURSE; SHARPSHOOTER'S COURSE; COLLECTIVE FIRE; EXPERT RIFLEMAN'S TEST.

GENERAL REMARKS.

158. TABULATION.—For convenience of reference, a part of the general scheme set forth in paragraph 100 is here tabulated in detail.

The tables are four in number and relate to the four divisions of the subject, viz, marksman's course, sharpshooter's course, collective fire,

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and expert rifleman's test. Each table is followed by regulations, partly in explanation of, and partly in addition to, the table. It will be always understood that the tables have the force of written regulations.

159. MARKSMAN'S COURSE.

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Slow fire.

Ranges (yards).	Instruction practice.			Record practice.		
	Time limit.	Scores.	Positions.	Time limit.	Scores.	Positions.
200	No limit.	Minimum of two.	Standing.	A maximum of 1 minute per shot, time to be computed from full appearance of the target to the discharge of the piece.	2	Standing.
300			Kneeling and sitting.		2	Choice of kneeling or sitting.
500			Prone.		2 s. s. 2	Prone.
600			Prone.		2 s. s. 2	Prone.

Rapid fire.

Ranges (yards).	Instruction practice.			Record practice.		
	Time limit.	Scores.	Positions.	Time limit.	Scores.	Positions.
200	20 seconds.	Minimum of two.	Standing.	20 seconds for each score.	2	Standing.
300	20 seconds.		Kneeling and sitting.		2	Choice of kneeling or sitting.

Skirmish fire.

Ranges (yards).	Instruction practice.				Record practice.			
	Time limit.	Shots.	Positions.	Runs.	Time limit.	Shots.	Positions.	Runs.
600	30 seconds.	2	Choice of prone, kneeling, or sitting.	Minimum of two.	30 seconds.	2	Choice of prone, sitting, or kneeling.	Two.
500	30 seconds.	2			30 seconds.	2		
400	30 seconds.	3			30 seconds.	3		
350	30 seconds.	3			30 seconds.	3		
300	30 seconds.	5			30 seconds.	5		
200	20 seconds.	5			20 seconds.	5		

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Slow fire.

160. TARGETS.—A at 200 and 300 yards; B at 500 and 600 yards. (See "Targets" under "Definitions.")

SIGHTING SHOTS.—Two required to precede the first score at 500 and 600 yards, record practice. No others are permitted except when the scores at either range are fired on different days. (See par. 113.)

POSITIONS.—Careful attention will be given to instruction in both the kneeling and sitting positions at 300 yards, instruction practice: but choice of these two positions will be permitted in record practice.

Rapid fire.

161. TARGET.—F at both ranges. (See "Targets" under "Definitions.")

PROCEDURE.—The magazine is filled, one cartridge loaded therefrom, and the piece then held at position "ready." At a signal given at the firing point (trumpet or telephone) the target appears, remains in sight twenty seconds, then disappears. The soldier attempts to fire five shots, emptying the magazine and firing at will, without command, from the instant any portion of the target appears until it has completely disappeared. Each unfired cartridge counts as a miss. In case of a defective cartridge or disabled piece the practice is repeated.

Time is regulated at the target, the signal at the firing point being given as a warning to the noncommissioned officer in the pit in charge of the target that all is ready at the firing point for the target to appear. For the method of marking and manipulation, see par. 126.

Skirmish fire.

162. TARGET.—Group target G. (See "Targets" under "Definitions.") One group for each skirmisher. Targets in line, with intervals of not less than 5 yards between centers of groups.

PROCEDURE.—A squad of convenient number is formed in line opposite the targets at a distance exceeding 600 yards; twenty rounds of ammunition per man are issued; magazines are filled and cut off, and, in accordance with Infantry Drill Regulations, the line is advanced in quick time to the 600-yard firing line. Here the line is halted and each skirmisher, without further command, takes one of the authorized positions and at the preparatory command for firing loads his piece from the belt.

The commands for firing are: 1. *Fire two rounds*, 2. *At 600 yards*, 3. *At the targets*, 4. COMMENCE FIRING. After the command of execution the firing opens at will and each skirmisher fires two rounds within the time limit of thirty seconds, the piece being used as a single-loader. At

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the expiration of the time limit the command "Cease firing" will have been given.

The firing having ceased, the advance is resumed and continued to the 500-yard firing line, where two rounds are fired in the same manner as at 600 yards; the advance then continues to the 400 and 350 yard firing lines, at each of which three rounds are similarly fired, and then to 300 and 200 yards, at each of which five rounds are fired from the magazine. The time limit at 200 yards, it should be noted, is twenty instead of thirty seconds, as at the other halts. Commands, in all cases, conform to the Infantry Drill Regulations.

The advance between 600 and 200 yards will be, between any two successive halts, the first half at quick and the second at double time; and it is enjoined upon the instructor to see that the double time is maintained as nearly as possible according to Infantry Drill Regulations, *i. e.*, length of step 36 inches, and cadence 180 steps per minute. The firing is completed at 200 yards.

Pieces will not be loaded during the advance, but only at the preparatory command for firing after a halt.

The time limit extends from the last note of "Commence firing" to the last note of "Cease firing." The instructor will see that the signals are properly sounded, not permitting the last note of "Cease firing" to be unduly prolonged. For each shot fired by the soldier before the commencement or after the close of the time limit, or for each shot fired in excess of the number ordered for the halt, five points will be deducted from his score. Five points will also be deducted for a failure to fire the number prescribed for a halt. A defective cartridge may be replaced by a file closer, but must be turned in before the advance is resumed. The substituted cartridge must be fired, if at all, at the halt where the missfire occurred and before "Cease firing" shall have been sounded. A piece disabled through no fault of the firer entitles the latter to another run. The instructor may find it advantageous after the "Cease firing" at 200 yards to march the line forward to inspect the result of the firing. Such advance will be made in line and will not approach closer than 10 feet from the targets, and in all cases the instructor will retain command of the line until dismissal, which will not take place in advance of the point of original formation. When more than twenty hits are found in a group target the score will not be counted and the soldier will make another run. In skirmish fire a particular run will always be for instruction practice or for record practice exclusively; men engaged in both instruction and record practice never running at the same time.

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163. SHARPSHOOTER'S COURSE.

Slow fire.

Ranges (yards).	Instruction practice.			Record practice.		
	Time limit.	Scores.	Position.	Time limit.	Scores.	Position.
800	No limit.	Minimum of two.	Prone.	A maximum of 1 minute per shot, time to be computed from full appearance of target to discharge of piece.	2 s. s. 2	Prone.
1,000			Prone.		3 s. s. 2	Prone.

Rapid fire.

Range (yards).	Instruction practice.			Record practice.		
	Time limit.	Scores.	Position.	Time limit.	Scores.	Position.
500	30 seconds.	Minimum of two.	Prone.	30 seconds.	2	Prone.

164. TARGETS.—C in slow fire and F in rapid fire. (See "Targets," under "Definitions.")

SIGHTING SHOTS.—Two required to precede the first score at 800 yards and three at 1,000 yards, record practice. No others permitted except when the scores at either range are fired on different days. (See par. 113.)

165. COLLECTIVE FIRE.

Ranges (yards).	Targets.	Position.	Volley fire.		Fire at will.	
			Time limit.	Volley.	Time limit.	Shots.
600	Figure targets: 16 lying; 16 kneeling; 16 standing. (See Definitions.)	Prone.	No limit.	3	1 minute.	3
800				3	1 minute.	3
1,000				3	1 minute.	3

166. TARGET.—L. (See "Targets" under "Definitions.")

PROCEDURE.—One object of this class of firing is to furnish a basis for comparison under similar conditions of the two kinds of fire—volley and at will. With this end in view the volleys will be first fired, and with only

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such intervals of time as are necessary for instructions pertaining to a following volley. The fire at will follows the three volleys at each range as soon as practicable, the instructor taking advantage, as in action, of the knowledge gained by the volleys to assist in securing effective results in the fire at will. The commands in both kinds of fire will conform to Infantry Drill Regulations. The degree of success in volley fire depends upon the steadiness of the trigger pull and to a great extent upon the simultaneousness of the fire, and this, in turn, depends upon the manner in which the command is delivered. A proper interval after the command "Aim" gives time for steadiness and correct sighting, the preparatory command "Company" (or "Troop") gives warning of the command of execution, "Fire," and prevents jerking the trigger. Although no instruction practice is prescribed for this class of fire, it should be preceded by a certain amount of preliminary drill with dummy cartridges or without cartridges, for the purpose of teaching simultaneous execution of the fire. It will be found that such practice will result in increased efficiency and accuracy in the volley fire at targets. The interval of time for the fire at will, three rounds, will be one minute and will be measured from the last note of "Commence firing" to the last note of "Cease firing." The instructor will see that the signals are properly sounded, not permitting the last note of "Cease firing" to be unduly prolonged. For each shot fired before the commencement, or after the close, of the time limit, or for each shot fired in excess of three, one point will be deducted from the total.

Cartridges failing to explode will not be replaced by individual shots but scored as if they had missed the target.

Collective fire will always be conducted by the company commander, assisted by the other company officers, if available. The post commander should exercise more than usual care in regard to collective fire, assisting the company commander in every way to obtain the maximum proportion of his company permitted for the practice.

For the collective fire the company will be deployed in single rank, with an interval of one pace between the men.

167. EXPERT RIFLEMAN'S TEST.

Ranges (yards).	Positions.	Slow fire.		Timed fire.		Skirmish fire.
		Time limit.	Score.	Time limit.	Score.	
200	Standing.	A maximum of 1 minute per shot, time to be computed from full appearance of the target to the discharge of the piece.	1	30 seconds.	1	One run.
300	Choice of kneeling or sitting.		1	30 seconds.	1	
600	Prone.		{2 s. s. / 1}	30 seconds.	1	
1,000	Prone.		{2 s. s. / 2}	----------	----------	

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Slow fire.

168. TARGETS.—A at 200 and 300 yards; B at 600 yards; C at 1,000 yards. (See "Targets" under "Definitions.")

SIGHTING SHOTS.—Two required to precede the score at 600 and the first score at 1,000 yards. No others are permitted.

PROCEDURE.—At each firing point two firers will ordinarily alternate with each other. At 1,000 yards, the first sighting shot having been fired, the two scores prescribed must be completed without interruption.

Timed fire.

169. TARGETS.—A at 200 and 300 yards; B at 600 yards. (See "Targets" under "Definitions.")

PROCEDURE.—As soon as the two individuals firing together have completed their scores at slow fire, at any range, they immediately fire their respective scores at timed fire alternately at that range, the man on the right firing first. In timed fire the magazine is filled and not cut off, and the piece, unloaded, is held at the position of "Load." The soldier commences firing at command and empties his magazine within thirty seconds, at the end of which interval the command "Cease firing" will have been given.

In case the trumpet is used, the time limit extends from the last note of "Commence firing" to the last note of "Cease firing." Each unfired cartridge counts as a miss. In case of defective cartridge or disabled piece, the score is repeated. For each shot fired before the commencement or after the close of the time limit five will be deducted from the score.

In order to insure impartial conditions to all participants, this test will be conducted by an officer and under the personal supervision of the post commander, and with all the particularity of, and in accordance with, the regulations governing competitions. (See "Competitions.") It will take place during the regular practice season, and if practicable after the regular course of target practice, including collective fire, shall have been concluded. It will not be preceded by instruction or preliminary practice.

Special tests may be held at any time, under the supervision of an officer detailed for the purpose (a field officer if practicable), in case of eligible men about to be discharged or otherwise deprived of the opportunity of attempting to qualify as expert riflemen.

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CHAPTER III.

SPECIAL COURSES A, B, AND C.

SPECIAL COURSE A.

170. WHEN USED.—When a complete range is not available, and a range of 200 and 300 yards can be had, practice may be conducted, if authorized by the department commander, as prescribed in the following special course A. This course is also prescribed for the troops of the coast artillery. The same special course may be followed for the supplementary firing at posts where, due to unfavorable conditions, the regular instruction practice can not be duly carried out.

171. *Slow fire.*

Ranges (yards).	Instruction practice.			Record practice.		
	Position.	Time limit.	Scores.	Position.	Time limit.	Scores.
200	Standing.	No limit.	Minimum of two scores.	Standing.	A maximum of 1 minute per shot, time to be computed from full appearance of target to the discharge of the piece.	2
300	Kneeling and sitting.			Choice of kneeling or sitting.		2
300	Prone.			Prone.		2

Timed fire.

Ranges (yards).	Instruction practice.			Record practice.		
	Position.	Time limit.	Scores.	Position.	Time limit.	Scores.
200	Standing.	30 seconds for each score.	Minimum of two scores.	Standing.	30 seconds for each score.	2
300	Kneeling and sitting.			Choice of kneeling or sitting.		2
300	Prone.			Prone.		2

Subject to the conditions noted in the table, the course will be pursued in accordance with regulations governing slow fire, marksman's course, and timed fire, expert rifleman's test.

SPECIAL COURSE B.

172. WHEN USED.—For posts where a range of 200 and 300 yards can not be obtained and special course A can not be followed, practice may, if authorized by the department commander, be as prescribed in the following special course B.

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173. *Slow fire.*

Instruction practice.						Record practice.		
Ranges (real), feet.	Ranges (simulated), yards.	Targets.	Position.	Time limit.	Scores.	Position.	Time limit.	Scores.
50	200	Y	Standing.	No limit.	Minimum of two scores.	Standing.	A maximum of 1 minute per shot, time to be computed from full appearance of target to the discharge of the piece.	2
50	300	Z	Kneeling and sitting.			Choice of kneeling or sitting.		2
50	300	Z	Prone.			Prone.		2

Timed fire.

Instruction practice.						Record practice.		
Ranges (real), feet.	Ranges (simulated), yards.	Targets.	Position.	Time limit.	Scores.	Position.	Time limit.	Scores.
50	200	Y	Standing.	30 seconds for each score.	Minimum of two scores.	Standing.	30 seconds for each score.	2
50	300	Z	Kneeling and sitting.			Choice of kneeling or sitting.		2
50	300	Z	Prone.			Prone.		2

Firing at miniature targets—service charges.

174. This target is founded on the following principles:

(1) The soldier who can hit an 8-inch bull's-eye at 200 yards with frequency is a fair shot, and requires little additional instruction to fit him for the firing line.

(2) With modern trajectory rifles, to hit a 1⅓-inch bull's-eye at 50 feet distance is a problem which ordinarily presents the same conditions as to hit an 8-inch bull's-eye at 200 yards.

(3) The course of target practice laid down in the firing regulations is in time of peace often, and in time of war usually, not practicable for the instruction of recruits, for the reason that ranges with proper facilities are often lacking, and time is short.

(4) A range of 50 feet enables the firer to see the hole made by the shot, and saves the time ordinarily taken in indicating the position of the hit.

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Description of system.

175. RANGE.—The range is 50 feet.

176. TARGETS.—The division of miniature targets X, Y, and Z (see "Targets" under "Definitions"), are, respectively, $\frac{1}{6}$, $\frac{1}{12}$, and $\frac{1}{18}$ of the size of the divisions on the A target, and subtend the same visual angle as do those of the A target when at 100, 200, and 300 yards.

177. COURSE.—The course is the same as special course A, using miniature target Y for 200 yards, and target Z for 300 yards firing. It is preceded, when there is no gallery range, by such firing at target X as is necessary.

178. FRONT SIGHT.—For firing at miniature targets a special front sight is provided by the Ordnance Department which slips over the service sight, obviating the necessity which would otherwise exist of aiming below the bull's-eye.

179. BACK STOP.—A back stop 10 feet high is, in point of safety, when firing at 50 feet, equivalent to a back stop of 60 feet at distance of 100 yards and 120 feet at a distance of 200 yards. It is generally possible to find in the vicinity of a post or camp a perpendicular cut bank having a height of 10 feet or more.

180. METHOD OF FIRING.—An instructed man is detailed to coach each recruit. The squad of recruits is drawn up facing the targets. At the command or signal "Commence firing" the recruits, under supervision of the expert shots detailed as coaches, fire slowly until 10 cartridges have been fired. The coach, standing by the recruit, corrects his fault of position or trigger pulling, points out the position of each shot, and in each case explains the cause of the miss. When 10 shots are fired the miniature targets are removed to serve as records, and replaced by new targets, when the firing, if necessary, recommences.

181. NUMBER OF MEN SHOOTING.—From 1 to 100 men may fire at the same time, this depending on the number of coaches and the extent of the back stop. With 30 men shooting at the same time, 1,000 men may finish the course of firing in 80 hours, as in time of war. This course will be pursued for the hasty instruction of volunteers and recruits in time of war, when, owing to the lack of time, range firing is impracticable.

SPECIAL COURSE C.

182. WHEN USED.—This course is prescribed for the use of the organized militia of the United States as far as conditions render it applicable, and will be preceded by sighting, position and aiming drills, gallery practice, and estimating distance drill, using the methods and rules prescribed in the firing regulations, United States Army, as far as they are applicable. Proficiency in estimating distances will not be a requisite for qualification.

183. The rules governing range practice for rifle and carbine are set forth in the following tables and regulations:

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Conditions and record of rifle and carbine firing in special course "C" required for qualification in the grades set forth below.

Marksman's record course.

Class of fire.	Ranges (yards).	Time limit.	Best scores not necessarily consecutive.	Positions.	Possible totals.
Slow fire.	200	(*)	2	Standing.	50
	300		2	Choice of kneeling or sitting.	50
	500		2	Prone.	50
	Total				150

Aggregates required to qualify in grades set forth below.

Third-class man.	Second-class man.	First-class man.	Marksman.
All who fail to make 10 in best score at 200 yards; and all who fail to make 67 in marksman's record course.	67	83	98

Sharpshooter's record course.

Class of fire.	Ranges (yards).	Time limit.	Best scores not necessarily consecutive.	Positions.	Best run.	Possible totals.
Slow fire.	600	(*)	2	Prone		50
Timed fire.	200	30 seconds for each score.	2	Standing		50
			Shots.			
Skirmish fire.	600	30 seconds	2	Choice of prone, kneeling, or sitting.	One.	100
	500	30 seconds.	2			
	400	30 seconds.	3			
	350	30 seconds.	3			
	300	30 seconds.	5			
	200	20 seconds.	5			
	Total					200

Aggregates required to qualify as sharpshooter.

Sharpshooter.

120 in marksman's record course,
and
40 at 600 yards, slow fire,
and
235 in marksman's and sharpshooter's record courses together.

Expert rifleman's record course.

Class of fire.	Ranges (yards).	Time limit.	Best scores not necessarily successive.	Position.	Possible totals.
Slow fire.	800	None.	2	Prone.	50
	1,000	None.	2		50
	Total				100

Aggregates required to qualify as expert rifleman.

Expert rifleman.

Aggregates necessary for sharpshooter,
and
With rifle 40 and carbine 38 at 800 yards,
and
With rifle 35 and carbine 33 at 1,000 yards.

* Max. of 1 min. per shot, time to be computed from full appearance of target to discharge of piece.

NOTE.—Fourth-class men are all who fail to report for rifle practice during the season.

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CLASSIFICATION.

184. The class in firing to which any officer or soldier belongs will be determined at the end of the practice season from the aggregate of the total of the best two full scores of five shots each (not necessarily consecutive) that he has made on the range, as follows:

Fourth class....All who have not fired.

Third class....All who report for practice and are unable to score 10 out of a possible 25 at 200 yards in any score, or who have fired two or more full scores at 200, 300, and 500 yards, and from the best two have made an aggregate of less than 67.

Second class....All who have fired two or more scores at 200, 300, and 500 yards, and from the best two have made a total of 67 out of a possible 150.

First class....All who have fired two or more full scores at 200, 300, and 500 yards, and from the best two have made a total of 83 out of a possible 150.

Marksmen....All who have fired two or more full scores at 200, 300, and 500 yards, and from the best two have made a total of 98 out of a possible 150.

Sharpshooters..All who have fired two or more full scores at 200, 300, 500, and 600 yards, and from the best two in each range have made a total of 160; and have fired two or more full scores, timed fire, at 200 yards (30 seconds firing interval in each score), and in the best two have made a total of 25; and have made one skirmish run of 20 shots, advancing from 600 to 200 yards; the total of all scores being not less than 235.

Experts....All who have made the necessary total to qualify as sharpshooter and have fired two or more full scores at 800 and 1,000 yards, and from the best two have made a total of 40 at 800 and 35 at 1,000 yards.

GENERAL REGULATIONS GOVERNING SMALL-ARMS FIRING BY THE ORGANIZED MILITIA OF THE UNITED STATES.

185. FIRING.—In slow fire, rapid fire, and skirmish fire, the rules laid down in the Regular Army course will be followed as far as applicable.

186. AMMUNITION.—The allowance will be fixed by the State.

187. PISTOL FIRING.—The same course as in the Regular Army, as far as applicable, taking into consideration the allowance of ammunition and facilities.

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188. GENERAL REGULATIONS.—The regulations as to range officers, pit regulations, and scoring to be the same as in the Regular Army.

Target year will be from January 1 to December 31. Practice season will be from May 1 to October 31.

189. REPORTS.—From each State a report of target firing will be forwarded on December 1. (See Appendix.)

190. SPECIAL COURSES "A" AND "B."—The methods pursued in these courses will be utilized, as far as applicable, when longer ranges are not available. No classification into marksmen, sharpshooters, etc., is possible under these courses.

191. INSIGNIA.—These will be uniform in general appearance for the different classes of marksmen in the several States.

192. FIGURE OF MERIT.—There will be a company, regimental, and State figure of merit, to be calculated by the methods laid down in the firing regulations of the Regular Army for calculating the individual figure of merit, and published by the War Department January 1 of each year. The State figure of merit, similar to the Department figure of merit, will be the combined figure of merit of its troops. All figures of merit will be computed by multiplying the number of expert riflemen by 200; of sharpshooters by 150; of marksmen by 100; of first classmen by 75; of second classmen by 50; of third classmen by 10; of fourth classmen by zero, and by dividing the sum of the products thus obtained by the total number of officers and enlisted men in the above seven classes.

193. COMPETITIONS.—There will be two classes of competition, State and national. State competitions, if practicable, will be held annually. The national competition, which will be held each year, will be at such place as shall be designated by the Secretary of War. The State teams visiting the national competition may, under section 14 of the act of January 21, 1903, receive pay, subsistence, and transportation from the appropriation for the support of the organized militia. The results of the national competition will be published by the War Department.

194. RULES AND REGULATIONS FOR COMPETITIONS.—These, as far as practicable, will be the rules prescribed for division and army competitions of the Regular Army.

195. MEDALS.—The medals for competitions in the State will be fixed by the State authorities. The medals for the national competition will be fixed by the Secretary of War.

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PART V.

THE PISTOL.

CHAPTER I.

NOMENCLATURE AND DESCRIPTION; CARE AND CLEANING; AMMUNITION.

NOMENCLATURE AND DESCRIPTION.

196. PARTS.—Plate XX shows a longitudinal section with parts of the mechanism exposed to view, with designation as follows: (*a*) Ejector, (*b*) recoil plate, (*c*) hand spring, (1) rebound lever, (2) stock screws, (3) hammer, (4) hammer stirrup, (5) hammer-stirrup pin, (6) hammer strut, (7) hammer-strut pin, (8) hammer-strut spring, (9) ejector spring, (10) crane lock, (11) crane-lock screw, (12) trigger, (13) latch spring, (14) ejector-rod head, (15) latch spring, (16) rebound-lever spring, (17) cylinder bolt, (18) hand, (19) side-plate screws, (20) mainspring. Plates XXI and XXII show the component parts separately.

197. DIMENSIONS.—Weight, 2 pounds 1 ounce; total length, 11.5 inches.

Barrel: Length, 6 inches; diameter of bore, 0.363 inch.

Rifling: Number of grooves, 6; width, 0.156 inch; depth, 0.003 inch; twist, one turn in 16 inches; width of lands, 0.03406 inch.

Cylinder: Length, 1.499; diameter, 1.52 inches.

Chamber: Number, 6; diameter, 0.3825 inch.

Front sight: Height above axis of bore, 0.6045 inch.

198. DRIFT.—The drift or deviation due to the rifling is in this arm to the left, but is more than neutralized by the pull of the trigger when the pistol is fired from the right hand.

CARE AND CLEANING.

199. GENERAL RULES.—The pistol should be kept clean, free from rust, and properly oiled. The oil should not be used in excess. Waste oil left in the mechanism will cause the parts to gum and work stiffly.

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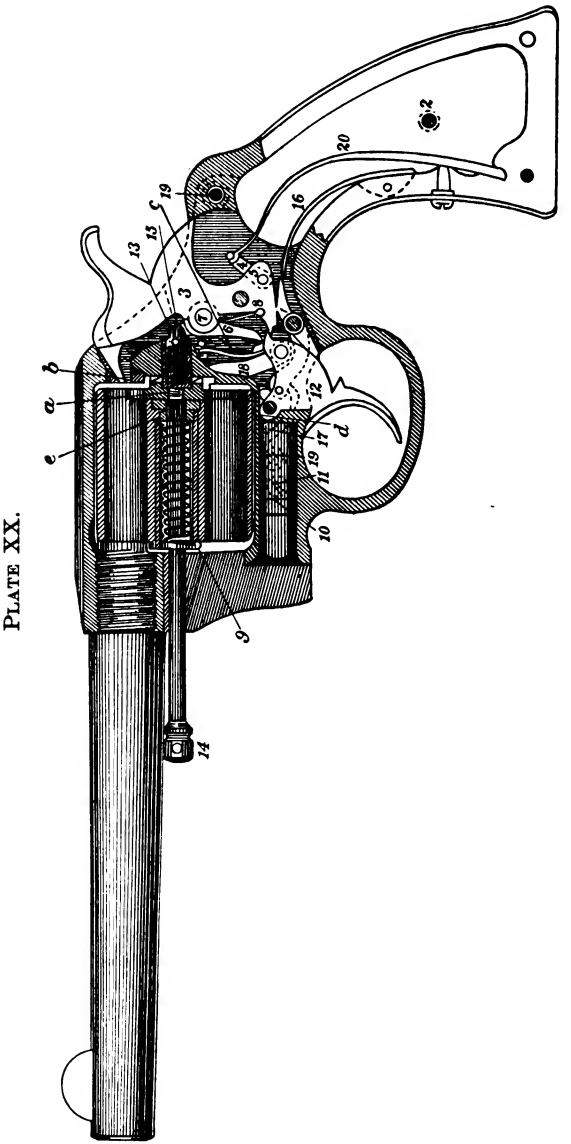

PLATE XX.

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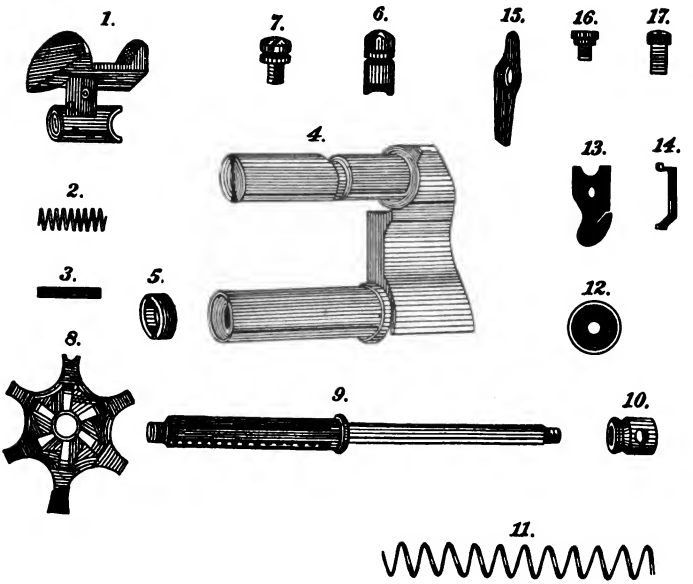
Plate XXI.



1. Latch.
2. Latch spring.
3. Latch pin.
4. Crane.
5. Crane bushing.
6. Crane lock.
7. Crane-lock screw.
8. Ejector.
9. Ejector rod.
10. Ejector-rod head.
11. Ejector-rod spring.
12. Recoil plate.
13. Cylinder bolt.
14. Cylinder-bolt spring.
15. Locking lever.
16. Locking-lever screw.
17. Side-plate screw (2).

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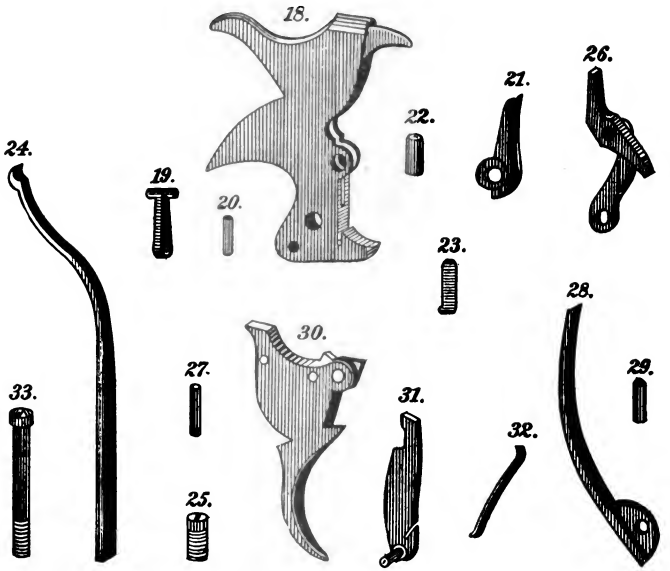
PLATE XXII.



18. Hammer.
19. Hammer stirrup.
20. Hammer-stirrup pin.
21. Hammer strut.
22. Hammer-strut pin.
23. Hammer-strut spring.
24. Mainspring.
25. Mainspring tension screw.
26. Rebound lever.
27. Rebound-lever arm pin.
28. Rebound-lever spring.
29. Rebound-lever spring pin.
30. Trigger.
31. Hand.
32. Hand spring.
33. Stock screw.

The tension screw should never be screwed in tightly unless the mainspring fails to explode the primer, and if screwed in too much pierced primers will result, and the pull, especially in the double-action, will be greatly increased. The lock mechanism must not be tampered with. The side plates should not be removed except under the supervision of a noncommissioned officer.

Never attempt to remove the side plate by prying it out of place. It should be jarred out of place by smart blows struck with a piece of wood on the left side of the frame where it is covered by the stock.

The side plate must be replaced from the rear so as to put its pin in rear of the hand spring. If this pin be placed in front of the hand spring, the spring will be destroyed upon cocking the hammer.

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The crane and cylinder must not be dismounted unless suitable tools are available.

Never attempt to open the cylinder when the hammer is cocked.

Never attempt to cock the hammer until the cylinder is fully closed and locked in the frame.

200. MANAGEMENT.—To eject the shells and load, push the latch to the rear and swing the cylinder to the left out of the frame; pressure against the front end of the ejector-rod head will empty the chambers and the cylinder is ready to be reloaded; swing the cylinder into the frame, taking care that it is revolved so that the cylinder bolt will enter one of the rectangular cuts in its surface.

201. DISMOUNTING.—The pistol is dismounted in the following order: Remove (1) crane-lock screw and crane lock, (2) crane with cylinder, (3) stock screws and stocks, (4) side-plate screws and side plate, (5) hand and hand spring, (6) mainspring, (7) hammer, (8) rebound lever, (9) rebound-lever spring, (10) cylinder bolt and spring, (11) trigger, (12) locking-lever screw and locking lever, (13) latch pin and latch with spring. To assemble, reverse this order.

The crane and cylinder should not be further dismounted unless it is necessary for making repairs. They are dismounted as follows: (1) Unscrew ejector from ejector rod (left-handed thread), (2) remove cylinder from crane arbor, (3) unscrew ejector-rod head from ejector rod, (4) unscrew crane bushing (left-handed thread), (5) remove ejector rod and spring. To assemble, reverse this order.

If it become necessary to replace a hand in a pistol, it is important that it be so adjusted that the upward movement of the hand will not begin to revolve the cylinder before the trigger withdraws the cylinder bolt. To insure this it may be necessary to file the hand slightly at the end which first engages the ratchet, and as this may bring the two points of the hand which engage the teeth of the ratchet too near together, the lower projection may also have to be slightly filed. The length and thickness of this lower projection must be adjusted so as to bring the cylinder in proper position for firing. This can be done only by expert workmen at a factory.

AMMUNITION (BALL CARTRIDGE).

202. DESCRIPTION.—This consists of a cylindrical brass base containing a suitable charge of smokeless powder, an exterior primer containing 0.3 grain of igniting composition, and a lubricated lead bullet weighing 150 grains.

203. PRIMER.—The primer consists of a cup which contains the primer composition (*a*), and an anvil (*b*), for resisting the blow of the firing pin. The anvil is pierced with two vents, by which the flame is communicated

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to the charge. Ignition is produced by crushing the composition between the cup and anvil by blow of firing pin.

204. POWDER.—The powder at present used is a Du Pont nitrocellulose sporting powder similar to that used in shotguns. The charge varies with the kind and lot. At present about 4½ grains are used.

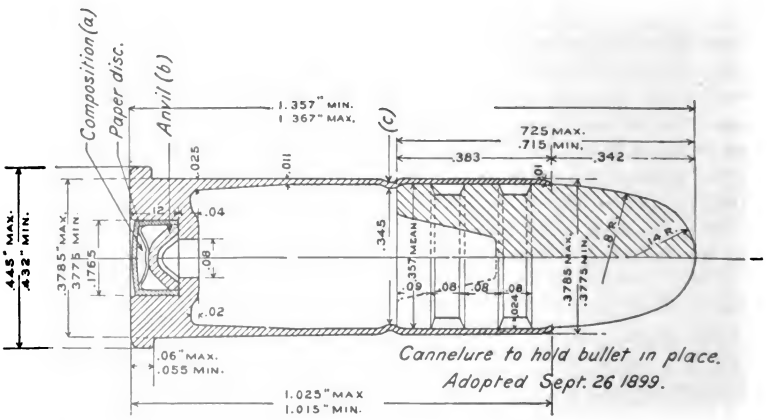
205. BULLET.—The form of the bullet is a cylinder surmounted by a conical frustum, which is surmounted by a spherical segment. Two rectangular cannelures contain the lubricant. There is a dished cavity in the base, by which the bullet is brought to proper weight without change of exterior form.

Length of bullet	inch	0.720
Diameter of cylindrical part of bullet	do	0.357
Total length of cartridge	do	1.362
Weight of bullet	grains	148

206. LUBRICANT.—The lubricant is Japan wax. The bullet enters the case beyond the cannelures, to entirely cover and protect the lubricant. To render the cartridge waterproof, the case is tightly crimped around the bullet.

207. PACKING.—The cartridges are packed in pasteboard boxes containing 20 cartridges each. One hundred pasteboard boxes, or 2,000 cartridges, are placed in one zinc case hermetically sealed, with handle for

PLATE XXIII.



tearing open. The whole is inclosed in a wooden box, the cover of which is fastened with thumbscrews and sealed with wire.

Weight of 100 cartridges	pounds	3
Weight of 2,000 cartridges	do	72

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CHAPTER II.

PRELIMINARY DRILLS.

208. POSITION AND AIMING DRILLS, DISMOUNTED.—For the instruction in position and aiming drill the squad will be formed with an interval of one pace between files. Black pasters or disks, to simulate the bull's-eye of the target, will be placed on the barrack or other wall, the squad being ten paces distant. The men will be instructed in taking aim at these disks and pulling the trigger. It is at this period that the soldier should receive the most benefit from careful individual instruction. Each soldier should be assured and encouraged in good positions or corrected in false ones. He should be impressed with the fact that the bullet would have gone to the place marked by the sight at the instant of aim, had the pistol been loaded.

Practice will be begun by going through the motions of aiming and firing to the front, using the commands and means laid down in the Cavalry Drill Regulations, 1903, paragraphs 185 to 187, inclusive. By facing the men in different directions, and using the same target, practice can be given in firing to the right and left, right front and left front, and right rear. The principles of slow fire, timed fire, and rapid fire will be taught in these drills.

209. POSITION.—The position of the soldier's body will be erect, head inclined slightly forward, left eye closed, with right eye looking along the line of sights. Latitude will be permitted in the position of the feet and generally in holding the pistol. It should not be held with too tight a grip, as tremors are more easily communicated by this position, but rather it should lie in the hand with just enough grip to hold it steady. Allowing the toe to protrude between the third and fourth fingers assures to many the correct position of the hand. A slight bend of the wrist and elbow are considered advantageous in holding the pistol, as there ensues less liability to tremors and the rear sight is brought nearer the eye.

In firing to the left the soldier may employ the left hand, aiming with his left eye.

210. AIMING.—In aiming, a fine sight, half sight, or full sight may be taken, the line of sight passing through the notch on the top of the breech of the pistol. In pulling the trigger the methods of aiming and position drill with the rifle should be at first employed, the soldier pulling the trigger gradually until he has learned to pull without a jerk.

Later, when more expertness has been acquired in catching the aim and in pulling the trigger, the soldier will be made to go through the motions of aiming and firing, as in rapid fire, firing at will five shots during an interval of so many seconds.

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211. QUICK AIMING.—In rapid fire, while bringing the line of sight on the mark, the soldier should keep his eye fixed on the mark and not on the sights. The great difficulty in accurate quick aiming with the pistol lies in the fact that when the front sight is brought upon the mark the rear sight is often found to be outside the line joining the eye with the mark. This is more liable to occur with the pistol than the rifle, for the reason that the pistol has no shoulder rest. This tendency to hold the pistol obliquely can only be overcome by a uniform manner of holding and directing the pistol, and this can only be acquired by much practice in the motions of slow and rapid fire. It is this fact that makes the aiming and position drill so important. The soldier should constantly practice aiming until he has arrived at such perfection that whenever the front sight is aligned upon the mark the rear sight will be found to be also in line with the eye and the mark.

212. IMPORTANCE OF NOT JERKING THE TRIGGER.—The trigger pull of the present pistol when new is about 12 pounds; more than that of the rifle or of the carbine. The soldier should be entirely familiar with the trigger pull of his pistol in order to do good shooting. If the trigger is pulled hurriedly, or with a jerk, the force required is such that the muzzle of the pistol will probably be diverted at the moment of firing.

The position and aiming exercises, if pursued assiduously, however, will obviate this tendency to jerk. The soldier should be required, when going through the motions of aiming and firing at a mark, to continue the aim for a moment after the hammer or firing pin has been released, and observe carefully if the pistol has been pulled off the mark. As with the rifle, the trigger pull should resemble a squeeze rather than a pull, the whole hand contracting.

213. SELF-COCKING ACTION.—The force required to pull the trigger when the Colt pistol, caliber .38, is used as a self-cocker is 17 pounds. The tendency to divert the muzzle in pulling the trigger is almost uncontrollable, and the best shots do not use the self-cocking action when close shooting is required. To accustom the soldier to the use of the self-cocking mechanism, and also to strengthen and develop the muscles of the hand, a few minutes' practice daily in holding the unloaded pistol on a mark and using the self-cocking device rapidly is recommended.

214. PISTOL; HOW COCKED.—After discharge, some men with large hands are able to cock the pistol with the right thumb while holding it in the position of aim. In other cases, where the soldier's hand is small, this can not be done, and it will be necessary to throw the pistol forward with a jerk while holding the thumb on the hammer.

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Lower Pistol.

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PLATE XXV.

Raise Pistol.

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PLATE XXVI.

Aim—Arm Extended.

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Aim—Arm Half Extended.

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POSITION AND AIMING DRILL, MOUNTED.

215. PRELIMINARY TRAINING OF HORSES.—This course must necessarily be preceded by much work during the year, having for its object getting the horses accustomed to the sight of the targets and to the noise of the discharge of the pistol. A useful method of accustoming the horses to noise of discharge is to have blank cartridges fired near them while the horses are being groomed on the picket line. The horse should also be trained to the sight of the targets.

216. QUICK-AIM DRILL.—The soldier must be instructed and practiced in taking rapid aim while the horse is in motion. To attain these ends, frequent practice should be had with the pistol throughout the year when drilling on the riding track, going through the motions of aiming and firing (at will) at silhouette targets and other objects placed along the track and 5 yards from it. This practice should be conducted at a walk, trot, or gallop. The soldier should also be taught, with dummy or blank cartridges, to eject cartridges and reload the pistol, with facility at all gaits.

217. BLANK-CARTRIDGE PRACTICE AT SWINGING DISKS.—After the men become fairly accustomed to aiming and snapping at the silhouette targets, blank cartridges should be used, and that men may judge the effects of their aim, the following simple device is recommended: Disks of leather, 5 inches in diameter, will be so suspended near the track that they may be moved by the blast of the pistol, which is very materially felt at 5 feet. For this practice the horse should not be permitted to be ridden nearer than 7 feet from the target. To insure this, barriers should be placed on the inside of the track.

218. PRELIMINARY RANGE-PRACTICE DRILLS.—The aiming and snapping exercises outlined above for the riding school will, in the target season, be extended to and amplified on the range, where a track will be laid out, as illustrated in Plate XXVIII, with a barrier in front of each target, to preserve a uniform distance from the horse to the targets. Parallel to and at 5 yards distance from this track will be placed five standing silhouette figures, 20 yards apart. The squad in column of troopers, with a distance between troopers of about 10 yards, will move around the track, at the walk, the trot, and the gallop, each trooper aiming and snapping his pistol at each target as he arrives opposite to it. After repeating this several times the instructor may use blank cartridges and repeat the exercise.

219. PRACTICE AS WITH BALL CARTRIDGES.—As soon as the horses become accustomed to the targets and the shooting, the procedure used in firing ball cartridges will be followed. The troop will be formed as illustrated in Plate XXVIII. At the proper command each trooper will move out from the right at a walk, take up the trot and gallop, and at the

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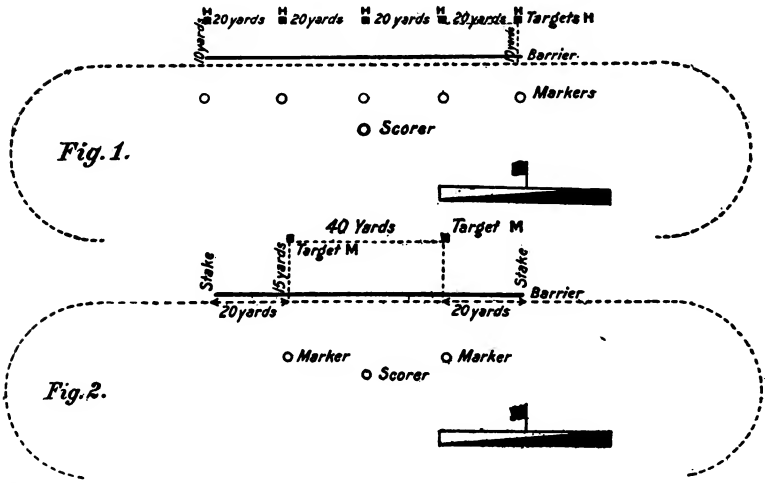
latter gait move along the line of targets, delivering one shot at each. He will then resume the trot and take his place on the left of the troop. The succeeding trooper will follow at such an interval, depending upon the tractability of the horses, as the troop commander deems most advisable, but preferably not moving out until the hits (if practice had been with ball cartridges) made by the preceding trooper could have been determined and the shot holes pasted.

PLATE XXVIII.



After the troopers become skilled in the use of the pistol, firing to the right, the practice will be conducted firing to the left; then, placing the targets obliquely to the track, the firing will be to the right front, to the left front, and to the right rear in the order stated. In firing to the left the men move out by trooper from the left, and move around the track with the targets on the left hand.

In the same manner practice will be had with blank cartridges in the procedure of rapid fire, mounted, target M, as laid down in paragraphs 244 and 245. In firing to the left the left hand may be used.

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CHAPTER III.

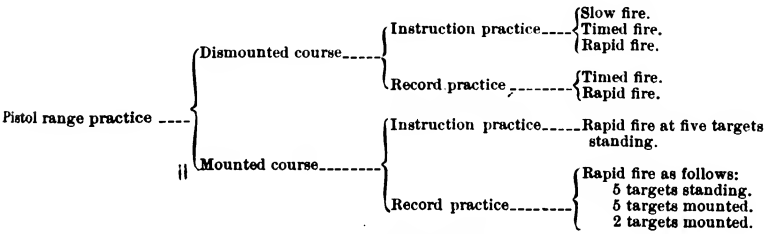
PISTOL RANGE PRACTICE.

DESCRIPTION; GENERAL REGULATIONS.

Description.

220. This practice includes the instruction of the soldier in firing with the service pistol at slow fire, timed fire, and rapid fire, dismounted course, and rapid fire, mounted course.

221. The general scheme is set forth in the following synopsis:



General regulations.

222. ALLOWANCE OF AMMUNITION.—The prescribed course presumes an annual allowance of service ammunition of 200 rounds per man for those taking the complete course and 100 rounds per man for those taking only the dismounted course.

223. PRACTICE SEASON.—Pistol range practice will take place during the season for rifle and carbine firing (par. 105). During the supplementary season such practice as the time will admit of will be given to recruits who have joined since the regular practice season and to others requiring it.

224. WHO WILL FIRE.—The full courses, dismounted and mounted, will be followed by all officers and enlisted men of each troop of cavalry. In the field artillery and in organizations partly armed with the pistol, those so armed will, when practicable, follow the dismounted course only. No officer nor soldier will be excused from pistol firing except by order of the department commander, upon application of the organization commander. Officers and enlisted men armed with the pistol and not included in the above enumeration will be permitted, but not required, to fire.

In the Philippine Islands pistol firing may be varied as the division commander may direct.

225. INSTRUCTION PRACTICE.—In all instruction practice the instructor, having required the soldier to fire the minimum prescribed in the

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tables, proceeds with such further firing as each particular case demands. The allowance of ammunition per man is fixed, but the instructor uses his judgment in the distribution of ammunition, all that is saved in the instruction practice of excellent shots being used in the training of poor or inexperienced shots. Instruction practice should be in fact what its name indicates, and the methods followed, the time consumed, and the ammunition expended are, within the requirements of these regulations, optional with the instructor.

226. RECORD PRACTICE.—In all record practice, both for dismounted and mounted courses, scores will be kept with ink or indelible pencil, if practicable, and by a noncommissioned officer detailed from an organization other than that firing.

227. ORDER OF PROCEDURE.—Pistol firing commences with instruction practice, dismounted course, and this practice is carried to completion for each soldier before proceeding to record practice, dismounted course, for that soldier. When the instruction practice, dismounted course, is completed, the soldier proceeds to record practice, same course, and follows this practice to completion in the order prescribed in the tables. The dismounted course completed, the soldier will be advanced to instruction practice, mounted course, in the order laid down in the table. When a soldier completes his instruction practice in either course he may begin record practice in that course, without waiting for others less advanced. While engaged in record practice, in either course, he will do no other firing in that course.

228. THE GAIT.—In all cases where the gait is a gallop the prescribed regulation gallop is meant. The canter will not be permitted.

In general the provisions of Chapter I, Part IV, will regulate pistol firing, where applicable, as well as rifle and carbine firing.

229. BLANK CARTRIDGES.—Exercises with blank cartridges, circling to the right, left, etc., and firing at the silhouettes on the track, should be carried on previous to firing with ball cartridges.

230. BARRIERS.—Barriers will be placed along the edge of, and parallel to, the track in front of the targets in order to preserve the prescribed distance from track to targets.

231. AMMUNITION SUPPLY.—Two soldiers are detailed to furnish ammunition and receive empty shells.

232. SYSTEMATIC INSTRUCTION.—All cavalry troops and all officers and enlisted men armed with the pistol will be instructed in its use. This instruction will be systematic and progressive, the controlling idea being accurate, rapid work.

233. SLOW FIRE; WHEN USED.—While rapid fire will, as a general rule, be the most effective, the occasion may arise when slow fire may be used

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to advantage, as when the range is considerable. On the other hand, rapid fire is necessary when the soldier is mounted and the horse is in motion.

234. NECESSITY FOR PREVIOUS INSTRUCTION IN SLOW FIRE.—Before instruction in rapid fire is commenced slow fire should be taught. The recruit in this way will be made acquainted with the proper methods of holding the pistol, of aiming, and pulling the trigger, the effect of the recoil on the trajectory, and the extent to which the front sight must be elevated or depressed at the different ranges. For this preliminary instruction slow fire is necessary and must be conducted dismounted. To properly measure the distance of the shots from the point aimed at, the bull's-eye target is preferably employed.

235. METHODS OF HOLDING THE PISTOL.—Pistol firing differs very materially from that of other small arms, mainly because the pistol has, at the time of aiming and firing, no support other than that afforded by the grip, and this itself depends upon individual peculiarities and ideas. Hence no fixed rule can be laid down for the manner of holding the pistol while firing either dismounted or mounted. This is especially so for the latter class of firing, where not only the manner of holding, but the method of pointing, differs among individuals. The object being good shooting, everything else must be subordinated to that idea. While these regulations suggest the loose grip of the pistol and a slight bend of the wrist and arm, this must not be insisted upon when better results can be obtained by holding the pistol with a tight grip in the hand with the arm rigid. In mounted practice, while as a general rule a shot should be delivered by lowering the pistol rapidly from the position of "raise pistol," it will be permitted the individual soldier to bring up his pistol from the position of "lower pistol" and deliver a shot in that manner. This will be left entirely to the discretion of the troop commander, who will be guarded by the controlling idea mentioned above.

CHAPTER IV.

PISTOL RANGE PRACTICE (CONTINUED).

GENERAL REMARKS; DISMOUNTED COURSE; MOUNTED COURSE.

General remarks.

236. TABULATION.—For convenience of reference the general scheme tabulated in paragraph 221 is here tabulated in detail. The tables are two in number and relate to the two divisions of the subject, viz, dismounted course, mounted course. Each table is followed by regulations partly in explanation of, and partly in addition to, the table itself. It will be always understood that the tables have the force of written regulations.

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237. *Dismounted course.*

Ranges (yards).	Instruction practice.						Record practice.			
	Bull's-eye target.				Disappearing target "K."		Bull's-eye target.		Disappearing target "K."	
	Slow fire.		Timed fire.		Rapid fire.		Timed fire.		Rapid fire.	
	Time limit.	Scores.	Time limit for score.	Scores.	Time limit for score.	Scores.	Time limit for score.	Scores.	Time limit for score.	Scores.
15	No limit.	Minimum of one.	30 seconds.	Minimum of two.	10 seconds.	Minimum of two.	----------	------	10 seconds.	2
25			30 seconds.		10 seconds.		30 seconds.	2	10 seconds.	2
50			30 seconds.		----------	------	30 seconds.	2	----------	------

SLOW FIRE.

238. Target A. (See "Targets" under "Definitions.")

TIMED FIRE.

239. Target as in slow fire.

240. PROCEDURE.—Time is taken at the firing stand by sandglass or watch. The target being up, the soldier stands with pistol at "raise pistol." The pistol is loaded with five cartridges, the hammer on the empty chamber. The command "Commence firing" is given and the soldier fires five shots within thirty seconds, at the end of which interval the command "Cease firing" will have been given. Unfired shots count as misses. In case of defective cartridge or disabled pistol the score is repeated. For each shot fired before the commencement, or after the close, of the time limit, five will be deducted from the score.

RAPID FIRE.

241. Target K. (See "Targets" under "Definitions.")

242. PROCEDURE.—The soldier stands with pistol at "raise pistol;" pistol loaded with five cartridges, hammer on empty chamber. At a signal given at the firing point (trumpet or telephone), the target appears, remains in sight ten seconds, then disappears. The soldier attempts to fire five shots, firing at will, without command, and using self-cocking action if he desires, from the instant any portion of the target appears until it completely disappears. Each unfired cartridge counts as a miss. In case of defective cartridge or disabled pistol the score is repeated. Time is regulated at the target, the signal at the firing point being given

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as a warning to the noncommissioned officer in charge of the target in the pit that all is ready at the firing point for the target to appear. (See "Pit Regulations," Chapter I, Part IV.)

Prior to rapid-fire practice the instructor should thoroughly drill his command in the manipulation of the pistol.

243. *Mounted course.*

Ranges (yards).	Instruction practice.		Record practice.					
	Figure target, standing, H.		Figure target, standing, H.		Figure target, mounted, M.			
					Five targets.		Two targets.	
	Gait.	Shots.	Gait.	Shots.	Gait.	Shots.	Gait.	Shots.
5	Gallop.	Minimum of 25.	-------	-------	-------	-------	-------	-------
10	Gallop.	Optional with troop commander.	Gallop.	25	-------	-------	-------	-------
15	Gallop.		-------	-------	Gallop.	10	Gallop.	5

RAPID FIRE.

244. Targets H and M. (See "Targets" under "Definitions").

For instruction practice five silhouettes are used and are placed 5 yards from the track with 20-yard intervals. Firings are to the right, left, right front, left front, and right rear.

245. RECORD PRACTICE.—With the targets (target H, silhouette of standing figure) arranged as shown in fig. 1, Plate XXVIII, the targets being 10 yards from the track, there are five circlings of the track at a gallop for each soldier, firing five shots in each of the prescribed directions, viz, to the right, left, right front, left front, and right rear, or twenty-five shots in all.

With the targets (target M, silhouette of mounted soldier) arranged as in fig. 1, Plate XXVIII, the targets being 15 yards from the track, there will be two circlings for each soldier firing five shots to the right and five shots to the left, or ten shots in all.

With the targets (target M, silhouette of mounted soldier) arranged as in fig. 2, Plate XXVIII, the targets being 15 yards from the track and 40 yards apart, there will be one circling of the track at a gallop, firing toward the right. Five shots will be fired, the soldier using his discretion as to what proportion of the five shots will be fired at each target. Firing will not be commenced until the trooper has arrived within 20 yards of a point opposite the first target and will cease when he has passed 20

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yards beyond the point opposite the second target. These limits will be marked by stakes.

246. ADDITIONAL PRACTICE—BALL CARTRIDGES.—This should be had during the supplemental practice season, for the purpose of instructing poor shots and recruits who have joined too late for practice during the last regular season.

247. METHOD OF SCORING.—A soldier will be detailed as marker for each target; he will stand in front of his target on the opposite side of the track. The targets are numbered 1, 2, 3, 4, 5 in succession, beginning with the target first fired at. As a shot is fired at a target the corresponding marker will run toward it and call out "Number ——, score 1" or "2" or "Miss" as the case may be. He will then cover the shot hole with a paster. One noncommissioned officer is detailed as scorer. His place is opposite the center of the arranged track.

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PART VI.

CLASSIFICATION; FIGURE OF MERIT; INSIGNIA AND TELESCOPIC SIGHT; INSPECTORS OF SMALL-ARMS PRACTICE; RECORDS AND REPORTS.

CHAPTER I.

CLASSIFICATION.

248. CONDITIONS AND REQUIREMENTS.—The conditions and requirements for qualification in the several grades of marksmanship are set forth in the following table and regulations:

Grades.	Estimating distance.	Rifle and carbine firing.											
	Average degree of accuracy required in 5 consecutive estimates of distances between 500 and 1,000 yards.	Total number of points and per cent of possible score required in record practice of each course for qualification.											
		Marksman's course.				Sharpshooter's course.				Expert rifleman's test.			
		Rifle.		Carbine.		Rifle.		Carbine.		Rifle.		Carbine.	
		Points.	Per cent.	Points.	Per cent.	Points.	Per cent.	Points.	Per cent.	Points.	Per cent.	Points.	Per cent.
Third-class man*													
Second-class man	75 per cent.	200	40	200	40								
First-class man	80 per cent.	250	50	250	50								
Marksman	85 per cent.	300	60	300	60								
Sharpshooter	90 per cent.					90	60	85	56⅔				
Expert rifleman	90 per cent.									204	68	201	67

*All who fail to qualify as second-class men or better.

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249. GENERAL REQUIREMENTS FOR QUALIFICATION.—All who qualify as marksmen take the sharpshooter's course; all who qualify as sharpshooters take the expert rifleman's course. In estimating distance, failure to qualify in a grade equal to, or higher than, that obtained in rifle or carbine firing reduces the final qualification of the soldier to one grade below that obtained in firing.

250. WHO WILL BE CLASSIFIED.—All who fire will be classified, unless excused from classification by the department commander. Those who fire and fail to complete the course, and are not so excused, will be classified as third-class men. All who were absent from the post by proper authority during the entire practice season and all who were excused from firing by the department commander will not be classified.

Soldiers who were discharged so near the beginning, or who joined so near the close, of the practice season as to have been unable to complete the course may be excused from classification by the department commander, but no such men will be excused until the company commander shall have shown in each case that it was impracticable to carry the course to completion.

251. UNCLASSIFIED.—Men who have been prevented by field service or other exigency from following any part of the prescribed course, and those who have been duly excused by the department commander, shall be reported as "unclassified," and the reason and authority therefor shall be quoted in the report.

When an unclassified man is discharged or transferred, his discharge certificate or descriptive list shall show his last classification, and also how much practice, if any, he had during the unclassified season and the per cent made, thus: Marksmanship, second-class men, 1900; unclassified, 1901; concluded slow and rapid fire, record practice, per cent, 79.

252. SPECIAL CLASSIFICATION.—A special classification of "marksmen" will be made for all who properly follow and qualify in special course A.

The requirement for qualification in this grade will be a total average of 80 per cent for record practice in the entire course.

CHAPTER II.

FIGURE OF MERIT.

253. OBJECT.—By the device of the figure of merit a comparison of the standing in marksmanship of different organizations can be instituted and a conclusion drawn as to their probable relative efficiency in battle.

It is composed of the individual figure of merit, dependent upon the accuracy of fire of the individual soldier; the collective figure of merit,

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showing the effect of the collective fire of the organization; and the general figure of merit, the mean of these two partial figures, which serves as the basis for final judgment.

254. INDIVIDUAL FIGURE OF MERIT.—The individual figure of merit will be computed by multiplying the number of expert riflemen by 200; of sharpshooters by 150; of marksmen by 100; of first-class men by 75; of second-class men by 50; of third-class men by 10; of those present but not firing by 0, and dividing the sum of the products thus obtained by the total number in the above seven classes.

255. COMPOSITION OF FIRING LINE IN COLLECTIVE FIRE.—As great a proportion of the company as possible should take part in collective fire, but to insure uniformity in comparisons, this proportion should be fixed in computing the classification, and should not be exceeded in the actual number of men firing. The firing line in collective fire, therefore, will be composed of not to exceed 85 per cent of all enlisted men of the company enrolled at date of firing.

256. THE COLLECTIVE FIGURE OF MERIT.—The results of the three volleys at each range, expressed in percentage, will be obtained by multiplying the total number of hits by 100 and dividing the product by three times the number expressing 85 per cent of all enlisted men borne on the rolls of the company at the time, regardless of the number firing. In computing the percentage the figures will be carried only to one place of decimals. The average percentage of the company for volley fire at all ranges will be obtained by dividing the sum of the percentages for each range by the number of ranges. The result of the fire at will will be calculated in the same manner. The collective figure of merit will be computed by dividing the sum of the average percentage of the company at volley fire and that at fire at will by 2.

As an illustration, let us assume a company of 65 men on the date of the collective fire of the company.

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Ordinarily the company will complete the collective fire in one day, therefore the strength is assumed the same for the three ranges. Then the computation will be as follows:

Ranges (yards).	Enlisted strength on date of firing.	Number actually firing.	Volley fire.					Fire at will.				
			Number of hits at each range.				Percentage computed as per regulations.*	Number of hits at each range.				Percentage computed as per regulations.*
			Lying.	Kneeling.	Standing.	Total.		Lying.	Kneeling.	Standing.	Total.	
600	65	54	20	65	35	120	72.4	18	70	37	125	75.4
800	65	54	19	60	31	110	66.4	25	65	30	120	72.4
1000	65	54	13	35	27	75	45.2	10	50	30	90	54.3
Aggregate percentage for each class of fire							184.0					202.1
Average percentage for each class of fire (dividing above by 3)							61.3					67.4
Aggregate percentage for collective fire							128.7					
Collective figure of merit (dividing above by 2)							64.4					

*Computation of this percentage is as follows:

Volley fire—

For 600 yards, $120 \times 100 = 12{,}000$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $12{,}000 \div 165.75 = 72.4$.

For 800 yards, $110 \times 100 = 11{,}000$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $11{,}000 \div 165.75 = 66.4$.

For 1,000 yards, $75 \times 100 = 7{,}500$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $7{,}500 \div 165.75 = 45.2$.

Fire at will—

For 600 yards, $125 \times 100 = 12{,}500$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $12{,}500 \div 165.75 = 75.4$.

For 800 yards, $120 \times 100 = 12{,}000$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $12{,}000 \div 165.75 = 72.4$.

For 1,000 yards, $90 \times 100 = 9{,}000$; 85 per cent of $65 = 55.25$; $55.25 \times 3 = 165.75$; $9{,}000 \div 165.75 = 54.3$.

257. GENERAL FIGURE OF MERIT.—The general figure of merit will be obtained by dividing by 2 the sum of the individual and collective figures of merit.

258. REGIMENTAL INDIVIDUAL FIGURE OF MERIT.—In determining the individual figure of merit of a regiment, the average of the results in its different companies will not be taken; but the total number in each class for the entire regiment will be multiplied by the proper multiplier and the computation similarly continued as in the case of a company.

259. REGIMENTAL COLLECTIVE FIGURE OF MERIT.—In the same way the regimental collective figure of merit will not be determined from the

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average of company figures, but computed independently, from the total number of shots fired and hits made in the volley fire and fire at will in all the companies.

260. REGIMENTAL GENERAL FIGURE OF MERIT.—The general figure of merit of the regiment will then be the average of these two partial figures.

261. GENERAL FIGURE OF MERIT OF A POST, DEPARTMENT, DIVISION, OR OF THE ARMY.—This will be obtained in a manner similar to that prescribed for a regiment.

The figure of merit of the Army will not include the troops serving in the Philippines, but for those troops a separate figure of merit, computed in general as herein prescribed, may be published from headquarters, Philippines Division.

262. REMARKS.—The commissioned officers of a company who fire will be included in computing its individual figure of merit.

Any other officers or enlisted men who, though not required to attend target firing may yet have practiced, will be included in the individual classification of the regiment, post, or department to which they belong, respectively, but will not be considered with any company.

In computing the figure of merit of a department or the departmental determination of the figure of merit of regiments, in cases where troops, during the practice season, change station within the United States from one department to another, the records of such troops only as may be serving in the department for the last month of the practice season will be considered.

For the figure of merit of the Army and the final determination of the figure of merit of regiments, all the companies of a regiment will be considered, even if serving in separate departments.

CHAPTER III.

INSIGNIA AND TELESCOPIC SIGHT.

INSIGNIA.

263. CLASSES.—Upon receipt at department headquarters of the company report of target firing, certain insignia indicating their skill in marksmanship will be issued to each expert rifleman, sharpshooter, and marksman; provided, however, that marksman's insignia will not be issued to those who have at any time qualified as sharpshooters, and sharpshooter's insignia will not be issued to those who have at any time qualified as expert riflemen.

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264. MARKSMAN'S PIN.—To marksmen, when first qualifying as such, will be issued a marksman's pin, which will be worn until the close of the succeeding practice season. If qualification is renewed in the succeeding season, the pin may be worn another year, and so on for further seasons, but if the grade of sharpshooter is attained, or that of marksman not reached, the pin will not be worn.

265. MARKSMAN'S PIN; SPECIAL COURSE A.—To marksmen, when first qualifying as such in special course A, will be issued a marksman's pin different in design from that for the regular course. If qualification is renewed in the succeeding season, the pin may be worn another year, and so on for further seasons, but if the grade of marksman is not reached the pin will not be worn.

This pin will be issued upon the certificate of the company commander that the soldier has qualified under the regulations as a marksman in special course A.

To the soldier who has qualified as a marksman in special course A for three years, not necessarily consecutive years, or, in the case of enlisted men, not necessarily in the same enlistment, a pin will be issued which will specify the years of qualification, and this pin will be worn above the marksman's pin so long as the soldier is entitled to wear the latter.

266. SHARPSHOOTER'S BADGE.—To the sharpshooter, a silver badge will be issued. For the year when qualification is first completed, the badge will consist of a pin and cross; the soldier having once qualified as a sharpshooter may continue to wear the badge even if qualification is not renewed in future years. To the soldier who has qualified as a sharpshooter for three years, not necessarily in the same enlistment, a silver bar will be issued, which will specify the years of qualification and will be attached to the badge between the pin and the cross. For each additional three years of qualification an additional bar will be issued, and each in succession attached below the one previously supplied and above the cross.

267. EXPERT RIFLEMAN'S BADGE.—To the expert rifleman will be issued a silver badge. The soldier having ever qualified as an expert rifleman may continue to wear the badge even if qualification is not renewed in future years. To the soldier who has qualified as an expert rifleman for three years, not necessarily consecutive years, or, in the case of enlisted men, not necessarily in the same enlistment, a silver bar will be issued, which will specify the years of qualification and will be attached to the badge immediately below the pin. For each additional three years of qualification an additional bar will be issued, and each in succession attached immediately below the one previously issued.

268. DUPLICATES.—These various insignia will become the property of the expert rifleman, sharpshooter, or marksman. If they are lost by the

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owner or in transmission to him, or if they become unsightly from long wear, they may be replaced without cost to the owner. But in all cases the official certificate of the company commander to the effect that he has investigated the circumstances of the loss or damage and finds that no negligence can be imputed to the soldier will be required as evidence upon which to make new issues. Duplicates, if desired for use on separate coats, will be sold to those entitled to wear the different insignia.

269. TELESCOPIC SIGHT.—To encourage effort, to reward efficiency, and to properly equip a special class of shots who shall be not only designated as expert riflemen, but who, in action, shall be employed as such, the telescopic sight is adopted. These sights will be supplied by the Ordnance Department and assigned to enlisted men who have qualified under these regulations as expert riflemen. They will be issued to and accounted for by the company commander, and, in his discretion, may be carried by the men at inspections under arms.

CHAPTER IV.

INSPECTORS OF SMALL-ARMS PRACTICE.

270. NUMBER AND DESIGNATION.—There will be detailed in connection with small-arms practice a number of officers, who will be designated as "inspectors of small-arms practice," one for each division and each department, at headquarters of the same.

271. DUTIES.—These officers should be selected with reference to their peculiar fitness and qualifications in this line of professional work. It will be the duty of the inspector of small-arms practice of each division and department to examine the regular reports of firings, and from these reports, and from personal inspections, to keep the division and department commanders informed of the absolute and comparative degree of proficiency manifested by the troops of the various units of the respective commands.

CHAPTER V.

RECORDS AND REPORTS.

272. RECORDS.—The "company target record" is the official record of the individual and company fire, record practice, of the company. All entries therein will be made in ink or with indelible pencil. It consists partly of a series of sheets, one for each soldier, ruled for the entry of his record practice and qualifications for each season of his three years' enlistment.

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Another part of the company target record is given to a record of the collective fire and the figure of merit of the company.

These sheets, forming the company target record, will be bound by the loose-leaf plan, so that at any time one or more sheets may be extracted and others inserted. By this means the book will at all times be a live record.

273. REPORTS.—All reports of target firing are submitted immediately after the close of firing, and, with the exception of the department and division reports, never later than November 5.

They are as follows:

1. Report of Target Firing and Classification. (Annual, company.)
2. Report of Pistol Firing. (Annual, company.)
3. Report of Expert Riflemen. (Annual, company.)
4. Report of Supplementary Target Firing. (Annual, company.)
5. Report of Small-arms Firing. (Annual, department and division.)
6. Report of Small-arms Firing. (Annual, State organized militia.)

These reports will be compiled in accordance with the prescribed forms furnished by the Chief of Ordnance, United States Army.

Coast artillery will render reports of target firing as prescribed by the Chief of Artillery. Field artillery and infantry will render the report of pistol firing so far as such firing is required.

All department reports in the Philippine Islands will be made to the commanding general of the division.

(For blank forms, records, and reports, see Appendix C.)

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PART VII.

TARGETS AND RANGES.

CHAPTER I.

TARGETS.

DESCRIPTION.

274. DIVISION OF TARGETS.—The best method of determining the probable efficiency of a soldier's fire in action, as indicated by the results of his target practice, is to divide the target into various divisions, and to give to hits in these divisions a value constant for all points in any one space, but increasing in value in proportion to the difficulty and desirability of hitting such a space, assuming it to be occupied by an enemy, the highest value being given, of course, to hits in the space occupied by the objective, usually called the "bull's-eye."

275. SLOW-FIRE TARGETS.—The shape and dimensions of the bull's-eye targets adopted for individual slow fire are based upon the above considerations. The objective, or that portion of the target upon which hits have the highest value, is in the case of each target a circle depending in size upon the range. Such targets are A, B, and C. (See "Targets" under "Definitions.")

276. RAPID, SKIRMISH, AND COLLECTIVE FIRE TARGETS.—In these classes of fire the bull's-eye target is not used, but, instead, a figure target. The figures are represented as standing, kneeling, lying, and mounted, respectively, and are used either alone or in groups, depending upon the kind of fire employed. Such targets are D, E, F, G, H, K, L, and M. (See "Targets" under "Definitions.")

CLASSES OF FIRE.

The sliding target.

277. PARTS.—This target, which slides vertically, consists of three principal parts:

(*a*) The timber-frame support to carry the guide rods.

(*b*) The two carriages which slide on the guide rods.

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(*c*) The two target frames (detachable from the carriages) to which the cotton cloth and paper targets are fastened.

278. THE TIMBER-FRAME SUPPORT (Plates XXIX and XXX).—This consists of a main sill, a top beam, two vertical sidepieces, and a horizontal and diagonal brace, brought to the rear from the sidepiece in planes perpendicular to the planes of the target; this frame can be readily set up

PLATE XXIX.

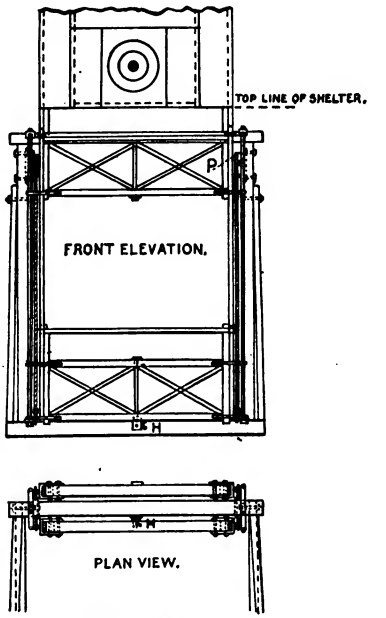

Fig. 1

Fig. 2.

Sliding Target.

and secured in any kind of a pit and behind any kind of shelter. Two pairs of iron slide rods (Plate XXX, fig. 1), one for the guides of each carriage, are so secured to the top beam and bottom sill that they can be readily removed. Near the top of each sidepiece of the support is a pulley (Plate XXX, fig. 3), whose position admits of a slight vertical adjustment. Sash cords attached at each end to one of the carriages run over this pulley and serve to raise one target to the position for firing as the other is withdrawn from view. The clamp (Plate XXX, fig. 4) by which the

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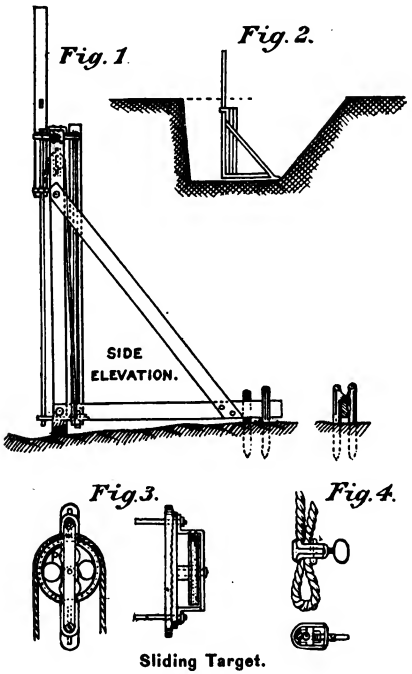
attachment of the sash cord is made, permits of an easy adjustment of the vertical distance between the targets.

PLATE XXX.



Sliding Target.

279. THE CARRIAGE.—This, never being exposed to bullets, is made of clear pine, dressed and painted for greater durability; it is rigidly trussed to prevent springing and jamming in the slides, and its different parts are interchangeable and so constructed that a broken piece can be readily taken out and replaced. For the 6 by 6 foot frame there is but one center brace and four diagonal crosspieces to each carriage; for the 6 by 12 foot frame, two more panels of the truss are added. To the top and bottom sill of the truss are secured slide irons, which move freely along the guide rods and serve to retain the target in position. A hook *H* (Plate XXIX, Fig 1), on the main sill of the support is provided for holding down the lower carriage when it is lightened by the removal of its target frame.

280. THE TARGET FRAMES.—These can be readily detached from the carriage; their parts are secured together by mortises and dowels, and

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fastened to the carriage by the same means. The bottom piece of the frame is covered by the paper target, and should, therefore, be so placed, when the target is in the firing position, that it can be seen by the soldier and hit by a low shot. The top piece of the carriage should be 9 inches below this piece of the target frame and covered by the marker's shelter. If so arranged, neither the carriage nor any part of the timber support is exposed to fire.

If the target, then, is properly set up, nothing but the target frame proper can be shattered by bullets; its parts—the side rails, the top and bottom rails, and (for the 6 by 12 foot frame) the braces—are issued as required and can readily be replaced by the soldier. The system possesses the advantage that by lowering the target halfway from the firing position the two frames are brought close together, can be easily protected from rain by a single piece of canvas if so desired, and in this position are partly sheltered, by the front of the pit; the target frames are also so easily removed that they can be stored under shelter when not in use.

Revolving (Laidley) target.

(Plates XXXI, XXXII, XXXIII.)

281. DESCRIPTION.—These are composed of two similar frames, each forming a target of the requisite size, securely joined to the opposite ends of two nave boxes and balanced on a common axle. The frames are made in preference of light wood, though iron of wedge-shaped cross section may be used without making the target unwieldy from its weight. The parts of the wooden frame are joined by pins of hard wood, the use of metal nails or screws, or anything that might obstruct the passage of the ball, being carefully avoided. The frames are made of only two different sizes—6 by 6 feet and 6 by 12 feet.

282. FRAMES.—The nave boxes are made each of two pieces of pine 20 by 5.75 by 2.25 inches plowed out and held together by wooden pins ½ inch in diameter, and receive the ends of the target uprights, which are secured in place by wooden keys. The broad faces are bored to take a wooden axle 2.5 inches in diameter. The frames are made each of two uprights 4 by 1.75 by 86 inches, which are mortised to receive the tenons of the two crosspieces, 4 by 1.75 by 74 inches for the smaller, and 4 by 1.75 by 146 inches for the larger target; the crosspieces are just 6 feet apart from outside to outside, the top one being 2 inches from the end of the upright; they are secured by wooden keys; the 12-foot target has diagonal braces at the upper corners of the frame to insure its stiffness.

283. COVERING.—White cotton cloth is stretched over the frame and tacked to it on the outside with small tacks, and a paper target of the size desired, on which the figure center, etc., are printed, is pasted on the

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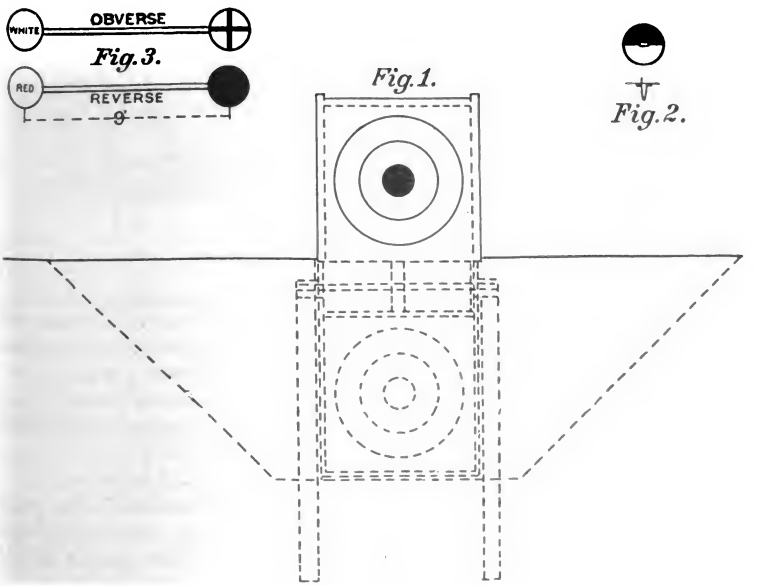
cloth. Two pieces of hard wood, 24 by 3.5 by 2.5 inches with a mortise through the middle and a 2-inch rabbet on each end, are pinned securely at both ends to the lower crosspieces at their middle point; two levers of hard wood 3 feet long, like a pickax handle, with a tenon on the large end, are fitted into this mortise, and secured by pins; they are used to turn the target; for the short and mid range target, 6 by 6 feet, these levers may, however, be advantageously omitted and the target turned by simply pushing on the upright adjacent to one of the markers.

284. JOURNAL BOXES.—Two journal boxes, 9 by 5.5 by 5.5 inches, made of hard wood and bored to receive a 2.5-inch axle, are placed over the ends of the axle preparatory to mounting the target and are pinned to the tops of the journal posts. The journals might be formed in the tops of the journal posts, but in that case the adjustment of the posts would require greater care to allow the target to revolve without binding in the journals. Further details of these and the other forms of targets will be found in the description of artillery and small-arms targets issued by the Chief of Ordnance.

285. MARKER'S SHELTER.—In constructing the shelter for the markers, the line selected for the targets should first be marked out, then parallel

PLATE XXXI.



Revolving (Laidley) Target.

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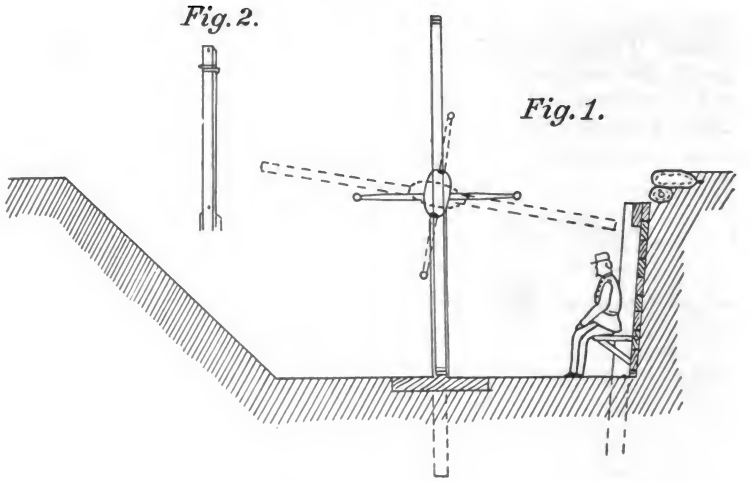
to it and 8 feet distant in the direction of the firing stand dig a trench 8 feet 3 inches deep, in which, if a retaining wall is necessary, dig holes for 7 by 7 inch posts, 2 feet deep and 3.5 feet apart, set 9-foot posts, their tops being about 1 foot below the edge of the trench, lay 2-inch plank between the posts and earth toward the firing stand, as shown in Plate XXXII. If necessary, revet the edge of the trench toward the firing point with two layers of sand bags, each 6 inches thick, the lower of stretchers and the upper of headers, breaking joints, the seams of the former and chokes of the latter toward the bank. A sod revetment of the same thickness may be used. The top of the revetment should be flush with the surface of the ground. Widen the trench to 13.5 feet, throwing the earth to the rear.

PLATE XXXII.



Colonel Laidley's Target.

The excavation on the side toward the firing point is nearly vertical, and on the reverse has a slope of 1 on 1. If it is found impossible to construct the shelter entirely in excavation, it may be constructed partly in embankment, but in such case the slope toward the firing stand must be very gradual—under no circumstances steeper that 1 on 6—in order that ricochets may not be impossible.

286. SETTING THE TARGET.—Set the journal posts, 8 by 8 inches by 10 feet, 3 feet into the ground, with their front faces parallel to the plane of the breastwork and 7 feet from it, and ram gravel or small stones well around them, their upper ends being at the same height, and 73 inches

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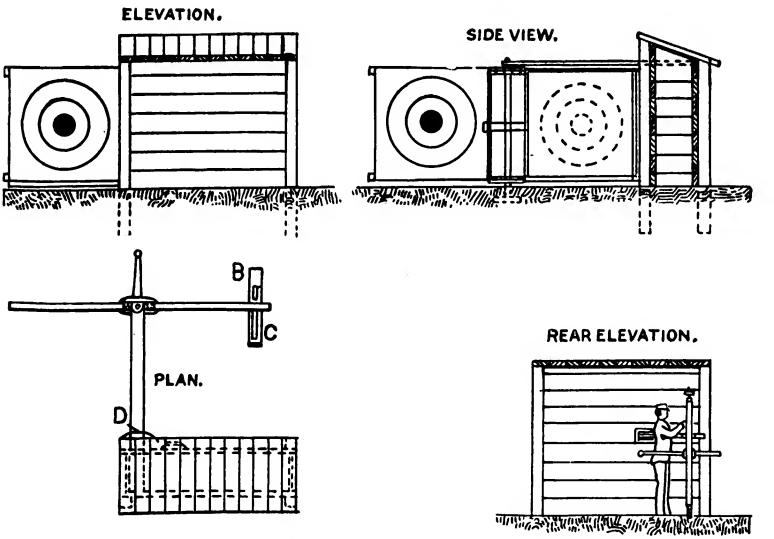
and 145 inches apart, respectively, for the two sizes of targets. This is accomplished most conveniently by laying the posts down on the ground in their true positions, and connecting them by two boards nailed to both, one near the top and the other say 5 feet below, parallel to the top, with a diagonal brace between them. Lay down a sill or spring block 6 by 6 by 36 inches, and embed it well in the ground in the middle of the space between each set of journal posts; a mortise is cut in the middle of the top face for the spring stop, which is made of hoop iron bent to the proper form and nailed to the sill; it serves to stop and hold the target when it is brought into an upright position. Nail a spring stop to the post nearest the middle of the width of the target. This stop is used to hold the target in a nearly horizonal position when firing is not being conducted. When the target is in use this spring should be hooked down so as not to interfere with the target when it is revolved.

287. SUNSHADES.—A shelter of boards or canvas secured to two arms hinged to the sides of two consecutive posts next to the edge of the target may be advantageously provided to protect the markers from the direct rays of the sun in case they become oppressive.

288. VERTICAL AXIS, LAIDLEY.—The target made to revolve around a vertical axis is shown in Plate XXXIII. The marker's shelter is formed

PLATE XXXIII.



of timbers of sufficient thickness to stop the balls, or the earth may be thrown up against it on the side toward the firing point. A block of wood

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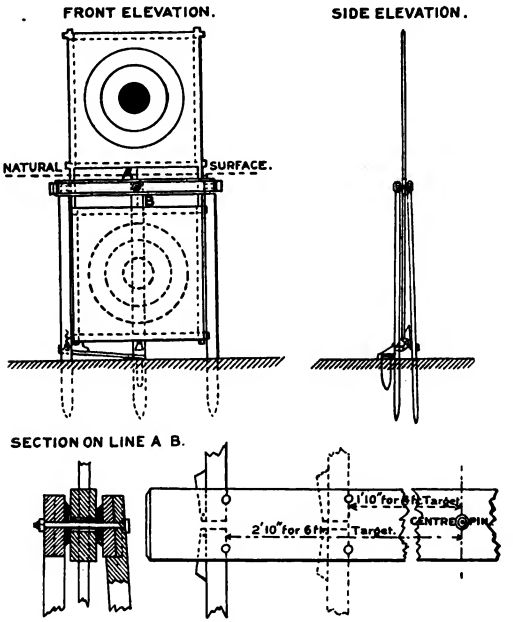
is sunk in the ground to form the gudgeon block. The upper end of the axis is held by a top support secured to the marker's shelter.

A block of wood, *B*, is set into the ground, and holds a spring which secures the target in the firing position. The pressure of the foot on the spring *C* releases it, and the target is turned so as to expose the other half to the firer, or it may be turned only 90°, in which case it is retained in position by the spring *D*. If the marker's shelter is given a length of about 18 feet, one of these targets can be placed at either end, sufficient intermediate space being afforded for their revolution, and the labor and expense of preparing the shelter and range greatly reduced.

The revolving (Texas) target.

PLATE XXXIV.



Revolving (Texas) Target.

289. DESCRIPTION.—This is a form of revolving target where the axis is in the plane of fire and the revolution is perpendicular to that plane. The center piece which revolves and carries the target frames is 7 feet long, 7 inches wide, and 2½ inches thick, in which mortises are cut for the

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reception of the vertical sidepieces of the target frames proper (Plate XXXIV); these sidepieces are made 7 feet long and mortised 1 foot from the lower end, so that the bottom sill of each of the two frames shall be that distance from the main crosspiece of the target. This main crosspiece will then, by the markers' shelter, be entirely protected from bullets. The mortises for the reception of the uprights of the target frame proper may be either 6 feet apart for a frame for the B target, or if a separate frame is desired for the A target they may be placed only 4 feet apart. The main centerpiece of the frame is bored out at its middle point for the reception of a short piece of 1¼-inch iron pipe, which is securely wedged in position. This pipe serves as a boxing for an iron bolt 7 inches long, which forms the axis of the target, and one end of which rests upon a post and the other upon a second post or upon a horizontal rail, connecting two other posts placed in front of the sidepieces of the target. Wooden washers placed on this axis keep the target from wabbling when it is revolved, the play being increased or diminished by means of a nut working on one end of the bolt. A wooden buffer on the rear post near the bottom presses the target against a spring, which holds it in the position for firing.

The rolling target.

290. DESCRIPTION.—This target rolls on a track placed at right angles to the range. The system consists of—

(*a*) A car (or two cars when the amount of firing renders a double target necessary).

(*b*) The requisite amount of track.

(*c*) A target frame for each car, these frames being either 6 by 6 feet or 6 by 12 feet, as is desired, readily detachable, and in all respects the same as the frames for the sliding target, except that the side rails are shortened at the bottom.

291. THE CAR.—This is shown in Plates XXXV and XXXVI. The frame is strongly made of seasoned clear pine, dressed and painted. The wheels are cast iron firmly fixed on a wrought-iron axle, in the same manner that railroad wheels are set on their axles. The bearings are cast-iron boxes fastened underneath the side rails of the car and are oiled through a hole in the side rail. The car is made long enough for a 6 by 12 foot target frame, which stands in holes in the end cross rails of the car. The 6 by 6 foot frame stands in holes in the two middle cross rails. The car is not heavy enough to withstand the pressure of a high wind without danger of overturning; this difficulty can be obviated, if necessary, by laying sand bags on the cross rails for ballast.

292. THE TRACK.—This is shown on Plates XXXV and XXXVI. The frame is strongly made of seasoned clear pine, dressed and painted; the rail, which weighs 8 pounds per yard, is firmly spiked to the frame and

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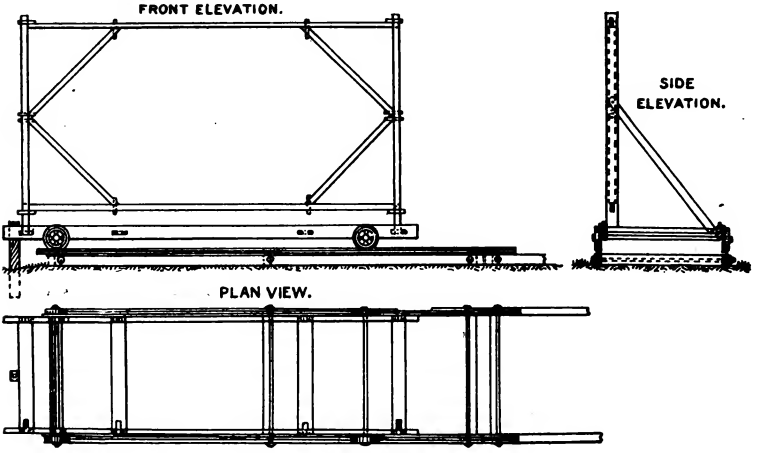
both ends supplied with fish plates for connecting together different lengths of track. Each piece of track is made 14 feet long, and complete weighs 165 pounds.

The track should be sunk in a pit deep enough to protect it and the car; that is, so that the top of the car will be 6 inches below the surface of the ground.

The arrangement of the track and markers' shelters for these targets is shown in Plate XXXVI. If but one car is employed, the marking for firing at the long ranges will be slow; this can be obviated by the use of two cars. The car rolls so smoothly that it can be easily pushed from

PLATE XXXV.



The Rolling Target.

behind the shelter to the firing position; the run can be limited by a stake driven at the proper place in the ground, or by a rope having one end fastened to the car and the other to a crosspiece of the track; the elasticity of the rope giving less jar to the car in stopping, it should be used in preference to the stakes. The rope, or an extra piece of sash cord, if desired, also affords a means of withdrawing the car from the firing position; a pole at the end of the car can be employed to hold it in the firing position, if necessary. If the wind should be so strong as to blow the car either way too rapidly, its motion can be regulated in going out with the sash cord, or in coming in with the pole.

293. MARKERS' SHELTER.—For extensive firing grounds for large posts, the markers' shelters for different targets can be placed on the same line, and a continuous length of track, extending the entire width of the range,

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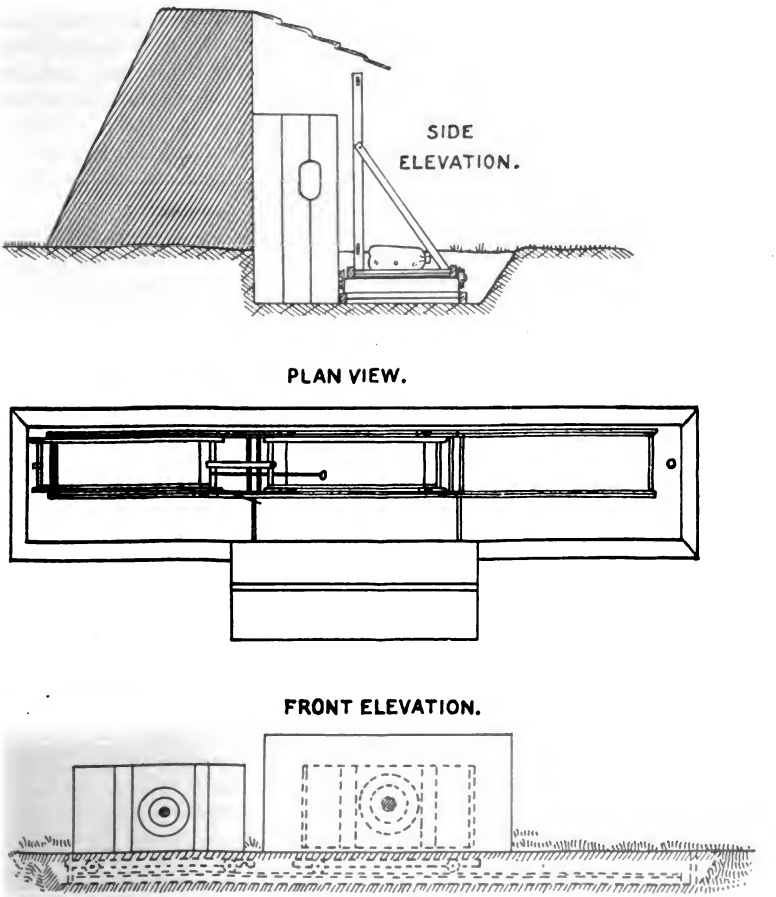
employed. The target can then be readily used as a moving target, the car being drawn by a rope between contiguous shelters. If desired, the steel target frames employed for skirmish firing may be attached to the car for practice firing at moving figures.

PLATE XXXVI.



The Rolling Target.

294. OBJECTION TO SYSTEM.—An objection to this system, common to all rolling targets, to those revolving on a vertical axis, or any other plan

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in which the targets are placed behind a shelter and are all or nearly all above the natural level of the ground instead of in a pit, is that the marker may sometimes expose himself beyond the end of the shelter. This disadvantage may be overcome by constructing end shelters placed perpendicular to, and 1 or 2 feet inward from, the end of the main shelter. These end shelters need only be pieces of plank nailed to a light frame. They also serve to protect the marker from wood splinters from the target, and also afford the necessary support for a light roof, which, if desired, may be constructed to shelter the markers and the target papers and different implements from the rain or sun. Holes in these end shelters permit the marker to use his shot-mark staff and the prop on the car. A further objection to the system is also found in the fact that, as generally placed, the markers' shelter will at some portion of the day cast a shadow on the target.

295. ADVANTAGE OF SYSTEM.—An advantage of the system, in addition to those formerly mentioned, is the ease with which the shattered parts of the target frame proper can be replaced, or the entire frame removed for storage or shelter.

For short-range firing a single car answers for two of the A targets. For practice at longer ranges the firing will be slow unless two cars are employed.

The Parker swinging target.

296. DESCRIPTION.—The frame (*BBBB*) is supported from a scaffold (*AAAA*) by means of the ropes (*CCCC*). It is guided by the uprights (*DD*) so as to swing parallel to the scaffold, and is caught and held in position by the latches (*EE*). A dummy target (*F*) is attached to the scaffold and appears above the butt (*G*). The frame (*BBBB*) holds the two targets which are fired at (*TT*). The dummy target is not fired at, but is used merely for indicating the position of the bullet in the targets below by means of the marking disk.

297. MODE OF OPERATING.—(1) The frame being swung to the right and the right-hand target being in view on the right side of the butt, it is fired at by marksman No. 1.

(2) The catch (*E*) being released, the frame is swung to the left, the left-hand target appearing to the left of the butt, and is fired at by marksman No. 2. While marksman No. 2 is aiming, the shot of marksman No. 1 is being pasted behind the butt, and is being indicated with the marking staff on the dummy target (*F*) above the butt.

(3) As soon as the shot of No. 2 has been fired the frame is swung again to the right in position for No. 1, who aims and fires, the shot of No. 2 being in the meantime pasted below and marked above on the dummy.

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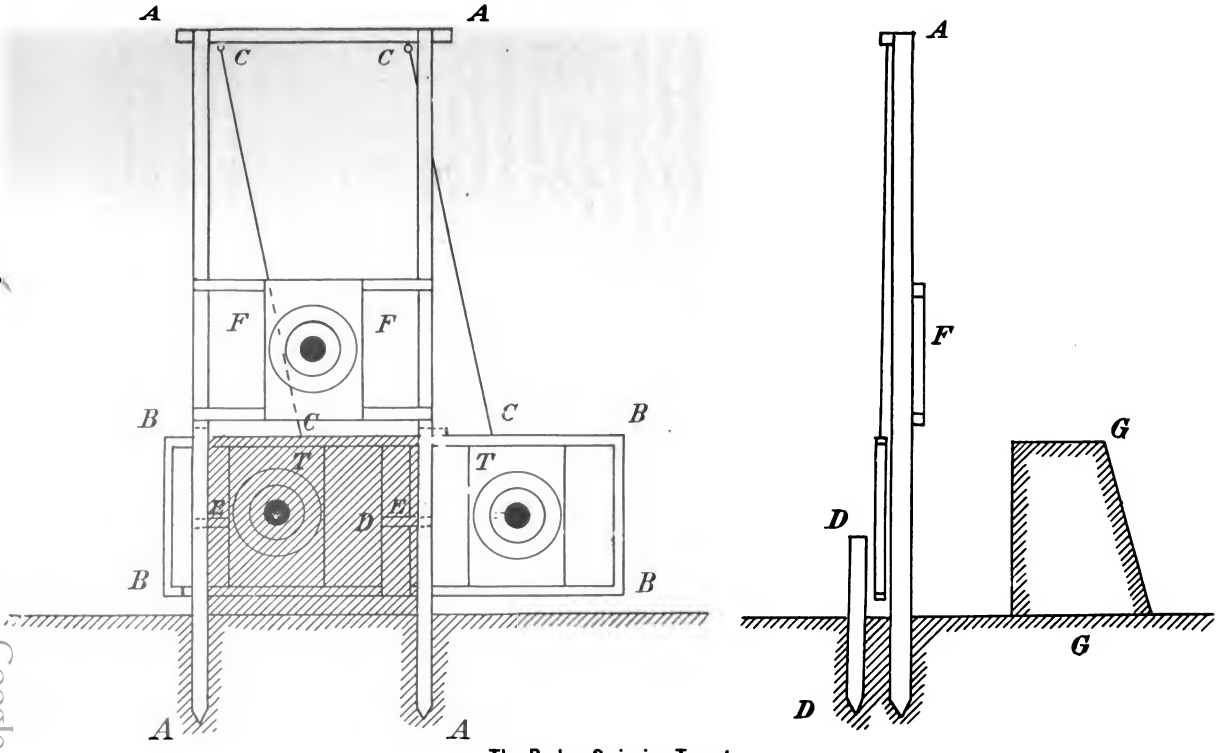

The Parker Swinging Target.

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298. ADVANTAGES OF THIS SYSTEM.—1. Simplicity. This target can be improvised, requiring no expert carpentering for the frame or for the scaffold. It therefore is more available for troops in the field.

2. Celerity. With the ordinary target the marksman has to wait until after the last shot has been marked before he can take aim, for the reason that the marking disk obscures the target. In the swinging target the shot is marked on an entirely different target, the aim not being interfered with.

GENERAL REMARKS.

299. SUPPLY OF TARGETS AND TARGET MATERIAL.—That all may obtain the proper practice, and yet the period of firing be not unduly prolonged, it is desirable that at least two separate targets with frames of 6 by 6 feet be available for each company: this will require for a one-company post two targets, and for larger posts twice as many targets as there are companies in the garrison. In addition, long-range targets should be supplied in the proportions of at least one for each three companies or fractional part of this unit. As the skeleton target frames for skirmish firing can be used by the companies in succession, no more will usually be required for large posts than for those garrisoned by a single company; all requirements will, therefore, except in very large garrisons, be met by the issue to each post of twenty frames of each of the standing, kneeling, and lying figures. Where this number can not be obtained, temporary wooden rectangular frames, to which cotton cloth can be attached and the proper silhouettes pasted, should be employed.

The cotton cloth for the target frame should be supplied in sufficient quantity to permit each target frame at the post to be re-covered twice a month during the practice season, and the frame of each figure target to be once covered. The paper targets, both for regular practice and skirmish firing, being comparatively inexpensive, should be supplied in sufficient quantity to permit a new one to be used, if so desired, for at least every other practice.

CHAPTER II.

RANGES.

300. RULES FOR SELECTION.—As the nature and extent of the ground available for target practice, and also the general climatic conditions are often widely dissimilar for different military posts, it will not be possible to prescribe any particular rules governing the selection of ranges, but only to express certain general conditions to which ranges should be made to conform as far as may be practicable.

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301. RANGES DISTANT FROM POST.—In view of the extreme range and penetration of the .30-caliber bullet, it is probable that in the future it will, in the case of many posts, be found necessary to have target practice conducted at a distance of several miles, or even farther from the post, necessitating the establishment of a camp on or near the range. The target practice can then be conducted uninterrupted by routine post duties, and fully as good, if not better, results obtained than on a range adjacent to the post.

302. SECURITY NECESSARY.—For posts situated in thickly-settled localities, where the extent of the military reservation is limited, the first condition to be fulfilled is that of security for those living or laboring near, or passing by the range; this requirement can be secured by selecting ground where a good natural butt is available, or by making an artificial butt sufficiently extensive to stop wild shots.

For complete security, there should be no road, building, or cultivated ground on either flank of the range, nearer than 300 yards.

303. DIRECTIONS OF RANGE.—The direction of the range with reference to the points of the compass should be determined, as far as practicable, from a consideration of the time most favorable for practice, the direction of the prevailing winds and the direction of the sun.

304. BEST TIME FOR PRACTICE.—It is desirable (if the weather is generally favorable at that hour) to hold the practice in the morning, for then the soldier will not have been fatigued by the day's drill or labor. This latter condition and the position of the sun point to the selection of a ground where the targets can be to the north or west of the firing point; the soldier will then have the sun behind his back or at one side, and never in his eyes; and the light on the targets will be uniform and not broken by the shadow of the markers' shelters.

305. BEST GROUND FOR RANGE.—Smooth, level ground, or ground with only a very moderate slope, is best adapted for a range. If possible, the targets should be on the natural surface of the ground on the same level with the firer, or only slightly above him. Firing down hill should, if practicable, be avoided.

306. EXTENT OF RANGE.—Final and important conditions require that the distance from the soldiers' barrack or camp to the range should not be excessive, and that the range should be sufficiently extensive to permit firing up to at least 1,000 yards.

307. INTERVAL BETWEEN TARGETS.—That the firing may, if desired, be brought under the direct supervision of a single officer, and to reduce to a minimum the amount of labor required in preparing the butt and ground, the targets should only be placed far enough apart to obviate the danger of a shot being fired on the wrong target. Fifteen yards between centers

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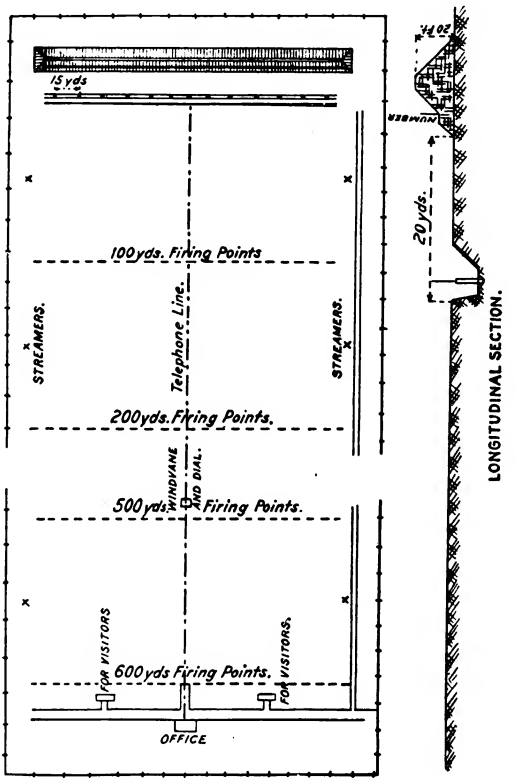
of targets will be found a good distance to fulfill this condition. (See Plate XXXVIII.)

PLATE XXXVIII.



308. CONTINUOUS SHELTERS.—For targets which revolve on a horizontal axis or slide vertically, if placed with this interval, the markers' shelter should be continuous, extending also in front of the space between the targets; this will afford all the markers complete shelter, and will permit those at any target to be relieved or communicated with without compelling a cessation of any firing.

309. SEPARATE SHELTERS.—When targets sliding or revolving horizontally are employed, or where it is not practicable to make the markers' shelter continuous, the targets should be arranged in pairs, with intervals of 6 to 10 yards between the targets, and about 50 yards between the pairs.

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Or, if the breadth of the range is not limited, the targets should be arranged singly and about 50 yards apart; each special range will then be entirely independent of those adjacent.

310. ARTIFICIAL BUTTS.—If an artificial butt is constructed, it should be made of earth, be not less than 20 feet in height (higher if practicable), and should not have a more gradual slope than 45°, this will compel a width, at the base, of about 15 yards. Nearly all the shots will bury in the lower portion of the butt, which from time to time will therefore require repairs. If the front slope is made in steps, the bullets can be dug out and the lead recovered without damaging the crest of the butt (see Plate XXXVIII). The butt should extend, at the summit, about 5 yards beyond the outside targets; it should be sodded on top, and sown with grass on the slopes.

311. HILLS AS BUTTS.—For a natural hill to form an effectual butt, it should have a slope of not less than 45°; if originally more gradual it should be cut into steps, the face of each step having that slope. For a temporary expedient the face of the hill might be plowed perpendicularly to the range, but as the bullets soon cut down the furrows, this measure must be frequently repeated to prevent the danger of ricochets.

312. BULLET STOPS.—At all posts where the range is not provided with a suitable stop butt, a small mound of earth will be erected behind each target of sufficient dimensions to retain most of the bullets that in practice pass through the target.

313. NUMBERING OF TARGETS.—Each target should be designated by a number; these, for ranges up to 600 yards in length, should not be less than 6 feet in height, and should be painted white on a black ground. The Arabic is preferable to the Roman notation, being more readily comprehended by the soldier; if made of the size suggested, they will always be quickly recognized, even in the haste and excitement of skirmish firing. They should be placed on the butt behind each target, but not so far above them as to prevent the soldier seeing the number when aiming at the target.

314. MEASURING THE RANGE.—The range should be carefully measured and marked with stakes at each 100 yards, in front of each target. The stakes should be about 12 inches above the ground, painted white and lettered in black, with the number of the corresponding target and its distance. These stakes will then designate the firing points for each target at the different distances. Particular care should be taken that each range thus marked out is perpendicular to the face of its own target.

315. FIRING MOUNDS.—If, on account of low ground, it becomes necessary to raise any firing point, a low mound of earth, no higher than is absolutely required, should be made; the mound should be about 8 feet square and carefully smoothed and sodded.

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316. RANGES PARALLEL.—The different ranges for the same distance should all be parallel, so that similar conditions with respect to wind and light may exist.

It is not essential, however, that the ranges employed for long-distance shooting should be parallel to those used for the ordinary company practice at distances of 600 yards, or less.

317. STREAMERS.—For ranges used for only a few companies, a pole extending about 20 feet above ground should be erected at one side of the range, near the targets, one near the 300 yards and one near the 600 yards firing points, from which streamers should be flown to indicate the direction and, approximately, the strength of the wind.

For large military posts, where considerable firing is held and the range, therefore, of increased breadth, a second line of poles and streamers should also be placed on the opposite flank of the range; these will be required, as otherwise the soldier can not, at the angle at which he sees the flags, correctly estimate the direction of the wind with reference to the range. At ranges where the topography of the surrounding ground causes local eddies or currents, the poles and streamers should be placed every hundred yards, or at any other points where they may be particularly required. A wind vane and clock face by which the direction of the wind with reference to the axis of the range can be expressed will also be found of considerable utility.

A pole and streamer should also be placed at the center and top of the butt; this streamer, and those at the side of the range, will then also serve as danger signals, to warn the surrounding inhabitants that firing is in progress.

318. PIT SHED.—A small house or shed should be built in the target pit, in which the marking disks and signal flags and spare parts of the target frames for making immediate repairs should be stored. It should be sufficiently large to afford a shelter for the markers in case of a sudden storm.

319. DANGER SIGNALS.—A socket for the staff of the danger signals should be placed on the markers' shelter in front of each target, and so inclined that the flag will always fall clear of the staff and be readily seen.

320. RANGE HOUSES.—On large ranges where competitive firing is held, a house containing a storeroom and several office rooms should be erected in some central place, off the range, but in its immediate vicinity. Such facilities as will enable visitors to satisfactorily witness the firing should also be provided.

321. TELEPHONE SERVICE.—When practicable, ranges should be equipped with a telephone system, connecting the target pit with each firing point, the range house, and the post.

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PART VIII.

COMPETITIONS.

322. The competition was instituted and exists for the purpose of fostering interest in target practice, of furnishing the means for the exchange of ideas among those who excel in small-arms firing, and for classifying the best shots according to merit shown under similar conditions. There will be six competitions yearly, as follows:

1. The Division Infantry Competition;
2. The Division Cavalry Competition;
3. The Army Infantry Competition;
4. The Army Cavalry Competition;
5. The Division Pistol Competition;
6. The Army Pistol Competition.

CHAPTER I.

DIVISION INFANTRY COMPETITION; DIVISION CAVALRY COMPETITION; ARMY INFANTRY COMPETITION; ARMY CAVALRY COMPETITION; DIVISION PISTOL COMPETITION; ARMY PISTOL COMPETITION.

THE DIVISION INFANTRY COMPETITION.

323. SELECTION OF COMPETITORS.—(*a*) *Enlisted Men.*—The commanding officer of each company of infantry and of engineers armed with the rifle will annually select from the enlisted men of his company the most suitable soldier, due regard being paid not only to the excellence of shooting, but to steadiness and good soldierly habits and conduct, and report the name of the man thus chosen to the post commander, who will send him to the place of competition on the date fixed by the division commander. If so desired, one competitor may also be selected in a similar manner from either the regimental noncommissioned staff or band, but not from both. Representation of the Hospital Corps will be permitted, but not required, the ratio being 1 competitor to 100 enlisted men of the Hospital Corps within each division. The post noncommissioned staff may be, but is not required to be, represented, the maximum being one from each department. Enlisted men of the Coast Artillery will be permitted, but not required, to compete, and will be selected by company commanders as in the case of infantry organizations. The selection will be reported

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through proper military channels to the division commander, who will take such action as the exigencies of the service demand.

(*b*) *Officers.*—Each post commander will report to department headquarters the names of any commissioned officers of infantry and of engineers armed with the rifle among the expert shots in his command who may desire to enter the competition and whom he can recommend for that purpose; further stating, whenever more than one officer is recommended, the comparative proficiency as rifle shots of those reported. From these reports, or from such additional reports of scores actually made as the department commander may require, the division commander will select two officers as competitors from each regiment of infantry in his command, one from each battalion of engineers armed with the rifle, and in addition such officers from the general staff and the different staff departments as he deems proper. In case a regiment is divided between two or more divisions, the final selection of officers therefrom will be with the War Department. The Coast Artillery may be represented at the discretion of the division commander, such representation to be based on the ratio of one officer to six companies.

ASSEMBLY.—The officers and enlisted men thus selected will be assembled at some convenient place early in August of each year, and after the completion of the preliminary practice will compete for places on the division team. In this competition the firing will be slow fire, rapid fire, and skirmish fire, and the composition of the team determined by the aggregate of the scores for all of those classes of firing.

324. PRELIMINARY PRACTICE.—The preliminary practice will consist for each competitor of the record practice, marksman's course, as prescribed in these regulations and subject to regulations governing competitions. The order of sequence of the various classes of fire (slow, rapid, and skirmish fire) will be determined by the officer in charge of the competition, the controlling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all the competitors.

COMPETITION PROPER.—The competition proper will consist for each competitor of the record practice, marksman's course, except in the number of scores and skirmish runs, which will be doubled or repeated, and all subject to regulations governing competitions.

The order of sequence of the various classes of fire (slow, rapid, and skirmish fire) will be determined by the officer in charge of competition, the controlling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all competitors.

325. DIVISION TEAM.—The strength of the division team will be in direct proportion to the number of competitors engaged in the respective division competitions, the ratio being fixed at one member of the team to

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five competitors, fractions not considered. Thus, from 75 competitors will be constituted a division team of 15 members; from 100, 101, 102, 103, or 104 competitors a team of 20 members; from 105 competitors a team of 21 members, and so on. The personnel of the team will be composed of those competitors making the highest aggregate scores for the entire competition proper.

326. PRIZES.—To the members of the division teams thus selected the following gold, silver, and bronze prize medals will be awarded, according to order of merit, and in the ratios indicated in the following table:

Number composing team.	Gold medals.	Silver medals.	Bronze medals.
6 or less	1	1	One to each remaining member of the team.
7 to 9, inclusive	1	2	
10 to 12, inclusive	1	3	
13 to 15, inclusive	2	3	
16 to 18, inclusive	2	4	
19 to 21, inclusive	2	5	
22 to 24, inclusive	2	6	
25 to 27, inclusive	3	6	
28 to 30, inclusive	3	7	
31 to 33, inclusive	3	8	
34 to 36, inclusive	3	9	
37 to 39, inclusive	4	9	
40 to 42, inclusive	4	10	
43 to 45, inclusive	4	11	
46 to 48, inclusive	4	12	
49 to 51, inclusive	5	12	

And so on, according to the principle illustrated in the above table.

These medals, and such others as may be won in the other regular competitions or matches, may be worn on all full-dress occasions. The winners will not part with them without authority from the War Department, but will preserve them, subject for inspection at any time.

The winner of a gold medal in a division or other authorized competition may, if he so elects, receive in lieu thereof a rifle or carbine of special design and superior workmanship, provided with the most improved sights, which will become his personal property, but which will not be used in competitions with men using the service rifle or carbine.

The presentation of competition prizes will be made, when practicable, at the conclusion of the contest and will be conducted with the ceremony and formality warranted by the importance of the occasion. Timely requisition should be made for the prizes required.

THE DIVISION CAVALRY COMPETITION.

327. SELECTION OF COMPETITORS.—For this competition the competitors will be selected from the cavalry and engineers using the carbine as in the Division Infantry Competition.

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The Signal Corps armed with the carbine may be, but is not required to be, represented, the ratio being 1 competitor to 100 enlisted men of the Signal Corps in the Division.

328. ASSEMBLY, ETC.—The competition itself will be conducted, the team constituted, and the prizes awarded in all respects in accordance with the rules governing the division infantry competition, except that the carbine will be used instead of the rifle.

THE ARMY INFANTRY COMPETITION.

329. SELECTION OF COMPETITORS.—Each year there will be assembled, at such time and place as may be designated by the War Department, competitors for the army infantry team. The competitors will consist of the members of the several division infantry teams and in addition any distinguished marksmen desiring to compete, whose scores at the last division infantry competitions equaled or exceeded that of the lowest member of the team in the same competitions, respectively. In order to afford opportunity to distinguished marksmen to compete for the army team, each division commander will cause those officers and enlisted men of the class of distinguished marksmen who use the rifle in practice, and who desire to compete, to attend the division competition, firing thereat in the usual manner during preliminary practice and competition. The scores that they make in the latter firing will be graded among those of all the competitors in order of merit, though they can not win a medal or a place on the division team.

330. PROCEDURE.—The army infantry competition, as regards the preliminary practice, the competitive firing, and the determination of the personnel, twelve in number, of the army infantry team, will be conducted in the manner prescribed for the division infantry competition.

331. PRIZES.—To the members of the army infantry team, in the order determined by this competition, the following prizes will be awarded: First prizes, to the first four members of the team, gold medals; second prizes, to the remaining eight members of the team, silver medals.

THE ARMY CAVALRY COMPETITION.

332. SELECTION OF COMPETITORS, ETC.—Competitors for the army cavalry team will be selected and assembled in a similar manner and at the same place and time as prescribed in the case of the army infantry competition. It may precede or follow the infantry competition or be conducted simultaneously with it, as may be most convenient. This competition in all respects will be conducted as prescribed for the division cavalry competition.

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333. PRIZES.—The order of merit of the army cavalry team will be decided as for the division cavalry competition. Prizes, twelve in number, will be awarded similar to those for the army infantry team.

THE DIVISION PISTOL COMPETITION.

334. DESCRIPTION.—Each year representatives of the service using the pistol, apportioned as below, will be assembled for division competitions with that arm. These competitions will be held at such places and times as may be designated in orders from division headquarters.

The places will be selected preferably from those at which are held division infantry or cavalry competitions, and the dates will, if practicable, immediately precede or follow the dates for those competitions.

335. SELECTION OF COMPETITORS.—(*a*) *Enlisted men.*—The commanding officer of each troop of cavalry, each battery of field artillery, and each company of engineers, mounted, will annually select from the enlisted men of his organization the most suitable soldier, due regard being paid not only to the excellence of shooting with the pistol, but to steadiness and good soldiery habits and conduct, and report the name of the man thus chosen to the post commander, who will send him to the place of competition on the date fixed in orders from division headquarters. If so desired, one competitor may also be selected in a similar manner from either the regimental noncommissioned staff or band of a cavalry regiment, but not from both. The post noncommissioned staff may be, but is not required to be, represented, the maximum being one from each department.

(*b*) *Officers.*—Each post commander will report to department headquarters the names of any commissioned officers of cavalry and infantry among the expert pistol shots in his command who may desire to enter the competition, and whom he can recommend for that purpose, further stating, whenever more than one officer is recommended from the same regiment, the comparative proficiency as pistol shots of those reported. From these reports, or from such additional reports of scores actually made as the department commander may require, the division commander will select one officer as competitor from each regiment of cavalry and infantry in his command, one from each battalion of engineers, and, in addition, such officers from the division and department staff as he may deem proper. In case a regiment is divided between two or more divisions the final selection of an officer therefrom will lie with the War Department. The Coast Artillery may be represented at the discretion of the division commander, such representation to be based on the ratio of one officer to six companies.

Other officers may be selected and reported to the War Department as follows:

By the Chief of Engineers, one officer from among the three battalions of engineers.

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By the Chief of Artillery, three officers from the Field Artillery and ten from the Coast Artillery.

Besides the above, a total of five officers from the General Staff Corps and staff departments may be selected by the War Department.

336. ASSEMBLY.—The officers and enlisted men thus selected will be assembled at times and places designated and, after the completion of the preliminary practice, will compete for places on the division teams. The number of members and the personnel composing the division teams will be determined as in the division infantry competitions.

337. PRELIMINARY PRACTICE.—The preliminary practice will consist, for each competitor, of the following practice, dismounted, viz: one score, slow fire, with a time limit of 30 seconds per shot, at each of the ranges 50 and 75 yards; one score, timed fire, with a time limit of 30 seconds per score, 25 and 50 yards, at target A; and one score, rapid fire, with a time limit of 10 seconds per score, at each of the ranges 15 and 25 yards, at the disappearing target K.

338. PROCEDURE.—The procedure in all classes of firing will be as prescribed in dismounted course in these Regulations, and subject to regulations governing competitions.

339. COMPETITION PROPER.—The competition proper will consist, for each competitor, of the same firing prescribed for preliminary practice, except that the number of scores will be, at each range for each class of fire, two instead of one. The order of sequence of the classes of fire (slow, timed, or rapid fire) will be determined by the officer in charge of the competition, the ruling feature of whatever programme adopted being to secure as nearly as possible equal conditions of firing for all competitors.

340. DIVISION TEAM.—The number of members and the personnel composing the division teams will be determined as in the division infantry competitions.

341. PRIZES.—To the members of the division teams thus selected the following gold, silver, and bronze medals will be awarded according to order of merit and in the ratios indicated in the following table:

Number composing team.	Gold medals.	Silver medals.	Bronze medals.
6 or less	1	1	1 to each remaining member of the team.
7 to 9, inclusive	1	2	
10 to 12, inclusive	1	3	
13 to 15, inclusive	2	3	
16 to 18, inclusive	2	4	
19 to 21, inclusive	2	5	
22 to 24, inclusive	2	6	
25 to 27, inclusive	3	6	

And so on, according to the principle illustrated in above table.

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These medals, and such others as may be won in the other regular competitions, may be worn on all full-dress occasions. The winners will not part with them without authority from the War Department, but will preserve them, subject to inspection at any time.

The winner of a gold medal in a division or other authorized competition may, if he so elects, receive in lieu thereof a pistol of special design and superior workmanship, provided with the most improved sights, which will become his personal property, but which will not be used in competitions with men using the service pistol.

THE ARMY PISTOL COMPETITION.

342. SELECTION OF COMPETITORS.—Each year there will be assembled at such time and place as may be designated by the War Department competitors for the army pistol team. The competitors will consist of the members of the several division pistol teams, and in addition any distinguished pistol shots desiring to compete whose scores at the last division pistol competitions equaled or exceeded that of the lowest member of the team in the same competitions, respectively. In order to afford opportunity to distinguished pistol shots to compete for the army team, each division commander will cause those officers and enlisted men of the class of distinguished pistol shots who desire to compete, to attend the division competition, firing thereat, in the usual manner, during preliminary practice and competition. The scores that they make in the latter firing will be graded among those of all the competitors in order of their merit, though they can not win a medal or a place on the division team.

343. PROCEDURE.—The army pistol competition, as regards the preliminary practice, the competitive firing, and the determination of the personnel, twelve in number, of the army pistol team, will be conducted in the manner prescribed for the division pistol competition.

344. PRIZES.—To the members of the army pistol team in the order determined by this competition, the following prizes will be awarded: First prizes, to the first four members of the team, gold medals; second prizes, to the remaining eight members of the team, silver medals.

CHAPTER II.

OFFICER IN CHARGE AND ASSISTANTS; MARKING, SCORING, AND SIGNALING; ARMS AND AMMUNITION; SHOOTING; TIES; PENALTIES; DISTINGUISHED CLASSES OF MARKSMEN; COMPETITIONS IN THE PHILIPPINE ISLANDS.

OFFICER IN CHARGE AND ASSISTANTS.

345. OFFICER IN CHARGE.—This class of firing will be under the general control of an officer of experience, assisted by such range officers and

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statistical officers as may be required. The officer in charge will prescribe the hours for any preliminary practice and for matches and competitions. He will also have general control of the range and of its police and government during the firing.

346. RANGE OFFICERS.—The range officers will supervise, in the target pit, the marking and, at the firing point, the scoring of the shots. They will also see that the competitors take, in firing, the prescribed positions, and that the squads at the different firing points preserve order and conform to the regulations of the range. One range officer will generally be required in the target pit to every two targets, and on the range an equal ratio to the firing points.

During skirmish fire a range officer, mounted, should supervise the firing of each two or three of the competitors, and a scorer will follow each competitor to keep record of the shots fired and prevent their being delivered at a wrong target.

347. STATISTICAL OFFICER.—The statistical officer will assign the competitors to targets and to order of firing, their determinations being generally made by lot. They will verify the additions of the scores as reported by the scorekeepers, grade them in order of excellence, and prepare the results for official announcement.

MARKING, SCORING, AND SIGNALING.

348. SIGNALING AND RECORDING HITS.—Hits in the different divisions of the targets, misses, and ricochets, slow, timed, and rapid fire, will be signaled and recorded as prescribed in these Regulations.

349. SIGNALING MISSES.—In slow fire, before any miss is signaled the target must be withdrawn from the firing position and carefully examined by a range officer. Whenever the target is reversed and a miss then signaled it will be presumed that this examination has been thoroughly made, and no challenge of the value signaled will be entertained or resignaling of the shot allowed.

350. SCORING IN SKIRMISH FIRE.—In skirmish fire, after the run is completed and the signal "Cease firing" has been sounded and repeated twice, the markers will examine the targets, the range officer will record the total hits on each, and the results will be communicated by means of prepared score cards to the statistical officer. In this fire the precautions with regard to the use of a red pencil in marking shot holes will be observed.

351. ACCIDENTAL DISCHARGE.—All shots fired by the soldier after he has taken his place at the firing point, and it is his turn to fire—the target being ready—will be considered in his score, even if his piece is not directed toward the target, or is accidentally discharged.

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352. FIRING ON WRONG TARGET.—Shots fired upon the wrong target will be entered upon the score of the man firing as a miss, no matter what the value of the hit upon the wrong target.

353. TWO SHOTS ON SAME TARGET.—In slow fire, if two shots strike a target at the same or nearly the same time, both will be signaled; and if a shot was just fired from the firing point assigned to that target, the hit having the higher of the two values signaled will be entered in the soldier's score and no record made of the other hit.

354. STATIONS OF SCOREKEEPERS.—The scorekeepers will be seated close to and in rear of the firing-point stakes, and will, as each shot is signaled, announce the name of the competitor and the value of the shot, and, at the conclusion of the score of each competitor, repeat his name and total score.

355. CHANGING A SCORE.—Competitors must pay attention to the score as announced and recorded, so that any error may be promptly investigated. The recorded value of any shot will not be changed after the following shot has been fired, unless some special message with reference to it is received from one of the range officers in the target pit. Any alteration of a score card must be witnessed by the officer in charge of the firing point and indorsed with his initials.

356. NUMBERING COMPETITORS.—At all meetings where a number of men engage in the same matches or competitive firing the labor of the statistical officers will be greatly lightened and the prompt announcement of the score facilitated by giving to each competitor a number by which he is known throughout the firing.

357. SCORE CARDS.—Each competitor should be given a score card stating his target and order of firing, and containing a blank space for the record of shots fired and for the signature of the scorer. These score cards should be printed on cardboard, using different colors for different ranges; but for all kinds of firing employing the same color for the same distance, as, for instance, all score cards for 200 yards, yellow; for 300 yards, red; for 500 yards, blue; for 600 yards, white, etc. This rule will prevent such a mistake as a competitor firing on a 300-yard score card, with its particular assignment of target, at 200 yards, as the scorekeeper quickly becomes familiar with the color corresponding to each distance.

As scores are completed an officer or noncommissioned officer detailed for that purpose should, without waiting for all the firing to cease, collect the records of the scores and transmit them to the statistical officer, who will enter them in the permanent record and their totals upon the bulletin sheets prepared for that purpose.

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ARMS AND AMMUNITION.

358. ARM TO BE USED.—In the authorized competitions officers and men will use the rifle, carbine, or pistol as issued by the Ordnance Department for habitual use in service.

359. ALTERING THE SIGHT.—Except that the sights may be blackened, no alteration of the regular service sights will be permitted. The use of detachable spirit levels, temporary shades for the sight, or orthoptic eyepieces is forbidden.

360. TRIGGER PULL.—The trigger pull must always be at least 3 pounds for the rifle and carbine and 4 pounds for the pistol and will be tested (holding the barrel vertically) by each competitor, under the supervision of a range officer, before firing each day and at each range. Competitors will submit their arms for further inspection whenever required.

361. AMMUNITION.—Unless the use of other ammunition is distinctly authorized, the ammunition used will be the service cartridge for the arm as issued by the Ordnance Department.

SHOOTING.

362. GENERAL REGULATIONS.—The rules governing every feature connected with range practice as prescribed in these regulations will, so far as applicable, regulate the procedure in competitions.

363. UNIFORM.—Competitors will wear the service uniform and cartridge belt.

364. SHELTERS FOR FIRER.—Sheds or shelters for the firer will not be permitted at any range.

365. PUNCTUALITY.—Competitors must be present at the firing points punctually at the proper time and in the order stated on their score cards. No application on the part of the competitor for any alteration in his assignment will be entertained.

366. ORDER OF FIRING.—In slow fire the competitors will place themselves at the firing points by twos and will fire alternately, the odd number of each pair being on the right and firing first.

367. LOADING PIECES.—Pieces will not be loaded except by command or until position has been taken at the firing stand. In loading the pistol only five cartridges will be inserted in the cylinder at one time.

368. POSITION IN PISTOL COMPETITIONS.—At the firing stand, when not firing, the pistol will be held either at raise or lower pistol. While firing, the pistol will be held and supported by one hand only, the arm extended at will, but free from the body and unsupported in any way.

369. WITHDRAWING TARGET PREMATURELY.—In slow fire if, just as a shot is fired, the target is withdrawn from the firing position, the scorer

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at that firing point will at once report the fact to one of the range officers, who, if upon investigation is satisfied that the case is as represented, will direct that the shot fired be not considered and that the soldier fire another shot.

370. DELAY OF SCORE.—In slow fire, competitors will not be hurried in their firing, but such slight delay permitted after each shot as they may desire, provided the time of firing the score does not exceed an average of one minute per shot. If an accident to a target, or any other cause over which the soldier has no control, prevents him completing his score within a reasonable interval, he will be permitted such additional time as a range officer may decide.

371. SKIRMISH FIRE.—In skirmish fire twenty cartridges will be issued before each run to each competitor, and the latter will not be permitted to have any other cartridges about his person. If any cartridge fails to explode it will be replaced by the scorer with a new one. The substituted cartridge must be fired, if at all, at the halt where the missfire occurred and before "Cease firing" shall have been sounded. If a gun becomes disabled the incomplete score will not be considered, but the competitor will repeat the run.

372. CHANGING ARMS.—No two competitors shall shoot in any competition with the same rifle, nor shall a competitor change his rifle during any competition, unless his first rifle has become unserviceable through an accident, which must be verified by a range officer. The same rule applies to the carbine and pistol. Willful and intentional violation of this regulation will warrant the officer in charge, in his discretion, excluding the competitor from further competition.

373. CLEANING PIECES.—Pieces can only be cleaned upon the completion of a score. In competitions at more than one distance cleaning will be permitted between distances. While, with these restrictions, cleaning will be permitted, it will not be required.

374. COACHING.—No "coaching" nor unnecessary communication of any kind with those actually firing will be permitted.

375. WARMING SHOTS.—No warming nor fouling shots will be allowed in any competition.

376. ORDER OF FIRE.—The order of fire will be determined by the officer in charge of the competition.

377. SPECTATORS.—During the progress of a match or competition, no one except the officers on duty at the range, the competitors, and score-keepers will be permitted within the ropes without special permission of the officer in charge.

378. STATIONS OF COMPETITORS AWAITING TURN TO FIRE.—The squads of competitors will be stationed ten yards in rear of the firing point, where

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each competitor must remain until called by the scorekeeper to take his position at the firing point and until he has completed his score.

379. EXPRESSIONS OF APPROBATION, ETC.—Expressions on the part of the competitors of approbation or disappointment, with reference to any scores made by themselves or others, must not be uttered loud enough to be heard at the firing point.

380. PROTESTS.—Protests and objections must not be directly submitted to the officer in charge, but to one of the range officers. In case a competitor considers the decision of the latter unwarranted by the facts as presented, he may appeal to the officer in charge. Final appeals from decisions of the officer in charge must be made in writing and forwarded through that officer to the authority ordering the competition.

381. SPECIAL RULES.—Such special rules or directions as the officer in charge may give must be rigidly complied with by competitors and all other persons upon the range grounds.

TIES.

Ties in rifle and carbine competitions.

382. IN SLOW AND RAPID FIRE.—In slow and rapid fire ties will be recorded as follows:

(1) By the highest aggregate score made in rapid fire; if still a tie, by the highest total score in rapid fire at 300 yards. If still a tie, the decision will be regulated by the highest total scores in succession made at 600, 500, 300, and 200 yards, slow fire.

(2) By the fewest misses in rapid fire.

(3) By the greatest number of hits on figure in rapid fire.

(4) By the fewest misses in slow fire.

(5) By the fewest outers in slow fire.

(6) By the fewest inners in slow fire.

(7) If still a tie, by firing single shots at the longest range.

IN SKIRMISH FIRE.—In skirmish fire ties will be decided as follows:

(1) By the greatest number of penalties imposed.

(2) By the greatest number of hits.

(3) By the fewest hits in kneeling figures.

(4) If still a tie, a special run in skirmish fire.

IN AGGREGATE SCORE.—Ties in the aggregate score will be decided by giving precedence to the competitor having the best total score in the skirmish fire. If the scores in the skirmish fire are also of the same total, the order of merit for that fire (and, therefore, the final order of merit) will be determined as in skirmish fire above.

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Ties in pistol competition.

383. IN THE AGGREGATE SCORE.—Upon the completion of a pistol competition, ties found in the aggregate scores of two or more competitors will be decided as follows:

(1) By the highest aggregate score made in rapid fire; if still a tie, by the highest total score made at 25 yards, rapid fire. The tie continuing, it will then be regulated, in succession, by the fewest misses and by the greatest number of hits on the figure, both in rapid fire.

(2) If necessary, the comparison will then extend to timed fire, and will be decided in the following order: (*a*) By the greatest number of penalties imposed; (*b*) by the highest total aggregate score; (*c*) by the highest total score made at 50 yards; (*d*) by the fewest misses at both ranges together; (*e*) by the fewest outers at both ranges together; (*f*) by the fewest inners at both ranges.

(3) The tie still continuing, the comparison will then extend to slow fire, and will be decided in the following order: (*a*) By the highest total score made at 75 yards; (*b*) by the fewest misses at both ranges together; (*c*) by the fewest outers at both ranges together; (*d*) by the fewest inners at both ranges together.

(4) If there be still a tie, it will be decided by firing single shots at 75 yards, slow fire.

PENALTIES.

384. EVADING RULES.—Any competitor who shall be detected in an evasion of the conditions prescribed for any competition shall be excluded from further participation in the firing.

Any competitor—

385. FIRING TWICE.—(*a*) Who shall fire in a name other than his own, or who shall fire twice for the same prize, unless permitted by the conditions of the competition to do so; or

386. FALSIFYING SCORES.—(*b*) Who shall be guilty of falsifying his score, or being accessory thereto; or

387. OFFERING BRIBE.—(*c*) Who shall offer a bribe of any kind to a scorer or marker shall, upon the occurrence being proved to the satisfaction of the range officers and the officer in charge, be reported in writing to the officer ordering the competition, who will then direct that the competitor be forever disqualified from taking part in future contests ordered by his authority.

388. INTOXICATION, ETC.—Any competitor refusing to obey the instructions of the officer in charge, or his assistants, or violating any of these regulations, or being guilty of unruly or disorderly conduct, or being intoxicated, will be immediately debarred from further competition at the

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meeting. The officer in charge will also report the facts in the case to the officer ordering the competition, who will take such further action as he deems proper.

389. INTERFERENCE.—Any person, whether a competitor or not, interfering with any of the firing squads, or annoying them in any way, will be warned to desist, and, if repeated, will be at once ordered off the range grounds.

390. ACQUAINTANCE WITH REGULATIONS.—Competitors and all others connected with the meetings of military riflemen must make themselves acquainted with the foregoing regulations, as well as with the conditions of competitive firing in which they may be participating, as the plea of ignorance of either of them will not be entertained.

DISTINGUISHED CLASSES OF MARKSMEN.

391. REQUIREMENTS.—Whenever a marksman has won three authorized medals in department, division, and army rifle or carbine competitions, or in department, division, and army pistol competitions, he will be announced in orders from the War Department as belonging to a distinguished class, no longer eligible to enter the division competitions with the arm in the use of which he is distinguished.

392. DESIGNATIONS.—If the three medals were won in rifle or carbine competitions, the marksman will be designated a "distinguished marksman," and if in pistol competition, a "distinguished pistol shot."

393. BADGES.—To distinguished marksmen and to distinguished pistol shots appropriate badges will be issued which, after being received by the soldier, if lost, can be replaced by purchase only, for which authority must be obtained from the War Department.

COMPETITIONS IN THE PHILIPPINE ISLANDS.

394. Competitions in the Philippine Islands will take place in such numbers, under such regulations, at such places, and at such times as the division commander may direct.

CHAPTER III.

INSTRUCTIONS AND SUGGESTIONS.

395. STATIONERY, ETC.—As soon as the officer in charge is detailed, stationery and office furniture should be obtained from the proper authority. The articles of stationery, such as envelopes, writing paper, typewriting paper, blotting paper, scratch pads, pens and holders, black and red pencils, black and red ink, mucilage, rubber erasers, etc., will ordinarily be obtained from department or division headquarters on requisition;

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the office and desk furniture, such as chairs, desks, typewriting machine, mimeograph or hectograph, rulers, steel erasers, etc., will ordinarily be obtained from the post quartermaster on memorandum receipt.

396. SELECTION OF ASSISTANTS.—In the selection of assistants too much care can not be exercised. Competitors are apt to be critical of all arrangements and the slightest irregularity furnishes ground for a protest. Close and continued attention to the work in hand on the part of both officers and enlisted men is essential to insure immunity from complaint.

397. STAFF OFFICERS.—Four staff officers are usually sufficient; one chief range officer; one adjutant and statistical officer; one quartermaster, ordnance officer, telephone officer, and, if the competitors encamp, one commissary. A medical officer and Hospital Corps detachment are also necessary if the encampment is distant from a post.

398. CHIEF RANGE OFFICER.—The chief range officer has charge of the range and pit and all details pertaining thereto. During the firing his place is on the firing line. During skirmish fire he personally commands the firing line.

399. RANGE OFFICERS.—Under the direction of, and as assistants to, the chief range officer are a number of range officers, not fewer than one to two targets in the pit, and one to two firing points on the range, or to two skirmishers in skirmish fire.

400. ADJUTANT AND STATISTICAL OFFICER.—To the adjutant may properly be assigned the direct charge of the competitors, whether they are encamped or assigned to companies in barracks.

The work of the statistical officer is most exacting. It is understood that, from the nature and importance of his duties, he must be absolutely accurate in his work. As a check, it is well to have two independent calculations of all scores, one by the officer and one by the clerk.

401. QUARTERMASTER, ETC.—This officer has charge of the supply of ammunition, sandglasses or timers, benches, tables, tents for shelter, boundary rope, trigger weights, and office furniture, and the preparation and care of the range house and range. In case of an encampment he cares for the equipage and, as commissary, the rations of the competitors.

402. DETAILS OF ENLISTED MEN.—The details of enlisted men for their several duties should be permanent for the competition; the men in the pit should remain in the pit and the scorers on the range should remain on the range. In skirmish firing, a noncommissioned officer should follow each competitor and should be instructed to kneel and sight over the shoulder of the firer to see that he fires on the proper target. These noncommissioned officers should be changed from one competitor to another for each run.

403. ASSIGNMENT TO TARGETS.—Instead of assigning competitors to targets by lot, it is believed fairer to assign them by a scheme worked out

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prior to the competition; this scheme so planned as to minimize the chances of collusion.

404. MOUNTS FOR RANGE OFFICERS.—The mounts assigned to range officers in skirmish firing should be perfectly broken to fire, thus permitting the undivided attention of the riders to the firing.

405. COMPOSITION OF SQUADS IN SKIRMISH FIRE.—Care should be exercised that the number of skirmishers composing a squad should never be greater than can be conveniently handled.

406. ARRANGEMENT OF RANGE IN SKIRMISH FIRE.—When the limitations of the range require the groups of targets to be so close as to cause possible confusion, assistance to the skirmishers in "catching" their targets will be given by staking the range at the halting points by small white posts, aligned accurately one behind the other, each row of posts extending in a direction perpendicular to the line of targets and placed on a line midway between groups. The skirmisher then makes his run between two lines of stakes, which direct his eye to the proper target, but which lend no assistance otherwise.

CHAPTER IV.

POST COMPETITIONS.

407. OBJECT.—To further the interest in target practice, post contests in small-arms firing for infantry, cavalry, and engineers are instituted, and if practicable will be held monthly throughout the year. When practicable these post competitions should take place on the same day as the monthly field or athletic exercises, or the following day.

The monthly report of drills and exercises will contain reference to these competitions. Post commanders will do all in their power to contribute to the success of these contests on these occasions, awarding to victorious teams extra privileges and encouraging the interest in the contests by their presence when practicable.

The program at these post competitions is left to the discretion of commanding officers. A series of courses is herewith suggested as being sufficiently brief to maintain the interest and sufficiently varied to meet the conditions at all posts.

The firing in these competitions will, as a rule, be team firing; teams usually will be composed of a total of five officers and enlisted men as principals and two alternates, to be selected by each organization commander from his company or troop.

It is recommended that, when practicable, competitions be held also between battalions, squadrons, and regiments.

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In case the conditions are unfavorable for mid-range or long-range practice, or for skirmish fire, the contests may be confined to short-range, slow, timed, and rapid fire. If no outdoor firing can be held, they will be held indoors at targets Y and Z with gallery or service ammunition.

408. RULES.—The rules governing the annual division and army competitions will, so far as applicable, regulate the procedure in post competitions.

Officers' contests will be arranged by post commanders; but care will be taken that not too large a proportion of the ammunition available for competitions is expended by officers.

Contests will be decided quickly, that the interest of the spectators may not flag. In some cases it may be well to adopt the methods of fire at will, each team firing on a separate target, all the members of the team firing at the same time with a time limit, marking to be postponed until the end of the firing.

Firing will not be confined to the best shots. Contests between teams of inferior shots, no member of which has in the last regular practice made more than a certain score at certain ranges, should be encouraged.

Individual contests will also be encouraged.

409. TEAM PRACTICE.—The success of a team depends not merely upon the individual skill of its members, but also upon such organization and training as will secure concert of action and mutual assistance.

ORGANIZATION AND TRAINING.

410. SELECTION.—For this reason the team and its alternates should be selected as long before the match as possible; in choosing the men it must be remembered that steadiness and reliability *in the match* are all-important. A good average shot is therefore to be preferred to one who, while sometimes making a brilliant score, at others makes a poor one. Good habits are indispensable. Tried shots are to be preferred to inexperienced ones who have never shot in important matches, as a veteran is to be preferred in other parts of a soldier's duty. At the same time care must be observed to recognize skill and steadiness in new men.

411. TEAM CAPTAIN.—The captain of the team should be a man of considerable decision of character, of an even temper, and without partiality or bias. He should be an experienced rifleman, a quick and accurate judge of the deviating influences, and have a thorough knowledge of the means to be taken to correct their effect. He should be able to inspire in the members of the team a confidence in his judgment, in order that they may yield their personal opinions, without controversy, to his instruction advice, and wishes.

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412. EXAMINING THE RIFLE.—As soon as the team is selected, the captain causes all the rifles to be carefully examined, and all deviations in the sights corrected. This is best ascertained by firing at a small mark at a short distance. If a piece is found to be disabled in any way, and the defect is not cured by changing the rear sight, another rifle should be substituted if practicable.

413. ORDER OF FIRING.—The rifles having been thoroughly tested, the team captain makes a careful record of the elevation and allowance for wind required for each at the distances at which the match is to be shot. He then arranges the order in which the men shoot, which order is thereafter always adhered to. The first men to shoot are selected for their judgment in relation to wind and elevation, and the last are the most steady and reliable shots in the team. The latter should be men of good sight, as matches frequently last until so late in the afternoon that the last shots are fired when the darkness renders it difficult to discern the target. When the men fire in different positions those using the same positions should be squadded together.

414. CAPTAIN'S RECORD.—The captain keeps a record of every detail, and, as soon as the practice has proceeded sufficiently, calculates the difference between the several men's shooting and informs the team, so that each man knows what elevation upon the rifles used by his companions corresponds to his own.

415. ELEVATION AND WINDAGE.—If the exact differences between the several men's rifles are known, and the men are steady, when one finds the target the others should at once know the correct elevation and wind allowance, and in following each other every change of wind or weather causing a variation in the flight of the bullets is at once noticed, so that even if one man makes a bad shot, his successor will make a better.

416. CONCERT OF ACTION.—No pains are spared to impress upon the men the necessity of concert of action and that the success of the team depends upon the weaker shots being prompted by the more expert, and any change in the wind or elevation at once communicated to those about to fire. For this purpose, perfect frankness is indispensable, and all deviations caused by an imperfect "pull off" or aim in firing should be announced, as well as any alteration in the aim taken.

417. SPOTTERS.—Each team should have a spotter, who is provided with a field glass, or, if practicable, a telescope. He has also a wooden target 12 inches square on which a miniature target is painted; this is placed on an iron rod 2 feet long when firing is to be held lying down, longer if the match requires other positions to be taken, having a foot piece 1 foot from the end to force it into the ground. The target revolves on this rod.

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The "spotter" habitually sits close to and on the right of the firing point, so as to be in easy view of the men firing. The miniature target is to his right, the rod being forced in the ground so as to bring the bottom of the target about the same height from the ground as the heads of the men firing.

He has two pins, both with colored heads, red for the man who shoots first, blue for the second. When a shot is fired he turns the target toward him, and as soon as the shot is signaled he announces its value and position (as, "a center at IX o'clock, close in"), inserts the proper pin in its exact position, and turns the target toward the firer. The competitors always watch the miniature target instead of the real one, both to avoid straining their eyes and because it is more exact.

418. CAPTAIN'S POSITION.—The position of the captain of the team (except when the firing is "offhand") is between the two men firing. He should keep the detailed score of each man in the manner suggested in the soldier's individual target record book, recording for each shot the exact point aimed at, as well as the point hit.

419. CAPTAIN'S DUTIES.—He personally examines each man's rifle before he fires his first shot, to be certain no mistake has been made in adjusting the sights; and when a sufficient allowance can not be obtained on the wind gauge, or when he considers it advisable to change the point of aim, rather than the allowance on the sights, directs him where to hold. When there are several targets adjoining he cautions him as he aims, "Fire on target —," and, without disturbing him, glances along his rifle to be certain that his aim is not shifted to a wrong target. He watches carefully that the rear sight is not inclined; if it is, he cautions the firer to "Turn your barrel to the left;" "Correct" (when the sight is perpendicular).

420. CAPTAIN'S DEMEANOR.—These cautions, as well as all other direction to the men firing, are to be given in a quiet manner, avoiding anything which will disturb their shooting. The same demeanor must be observed in the match itself. Impatience or irritation will do more harm than good, while a word of encouragement, given in a cool, deliberate manner, will do much to steady the nerves of a nervous man and prevent his "going to pieces."

421. DUPLICATE SCORES.—The scores in an important match should be kept in duplicate by a representative of each team. A similar representative should be placed in the butts at each target as a check on the marker.

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422. PROPOSED PROGRAMMES FOR POST COMPETITIONS.

WHEN A COMPLETE RANGE IS AVAILABLE.

(1)

Slow fire.	*Rapid fire.*
1 score at 200 yards.	1 score at 200 yards.
1 score at 300 yards.	1 score at 300 yards.
1 score at 500 yards.	1 score at 500 yards.

(2)

Slow fire.	*Skirmish fire.*
1 score at 500 yards.	1 run.
1 score at 600 yards.	

(3)

Slow fire.	*Rapid fire.*
1 score at 800 yards.	1 score at 500 yards.
1 score at 1,000 yards.	

(4)

Slow fire.	*Timed fire.*
1 score at 200 yards.	1 score at 200 yards.
1 score at 300 yards.	1 score at 300 yards.
1 score at 600 yards.	1 score at 600 yards.

(5)

Timed fire.	*Skirmish fire.*
1 score at 200 yards.	1 run.
1 score at 300 yards.	

SHORT-RANGE COMPETITIONS.

(1)

Slow fire.	*Timed fire.*
1 score at 200 yards.	1 score at 200 yards.
1 score at 300 yards (sitting or kneeling).	1 score at 300 yards (sitting or kneeling).

(2)

Slow fire.	*Timed fire.*
1 score at 300 yards (sitting or kneeling).	1 score at 300 yards (sitting or kneeling).
1 score at 300 yards (prone).	1 score at 300 yards (prone).

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(3)

Slow fire.	*Timed fire.*
1 score at 200 yards.	1 score at 200 yards.
1 score at 300 yards (sitting or kneeling).	1 score at 300 yards (sitting or kneeling).
1 score at 300 yards (prone).	1 score at 300 yards (prone).

(4)

Fire at will, 200 yards or any other selected range, exposure thirty seconds. Each team to have its own target. All teams fire simultaneously. Greatest number of hits wins.

INDOOR COMPETITIONS.

(1)

Slow fire.	*Timed fire.*
1 score at target X (standing).	1 score at target X (standing).

(2)

Slow fire.	*Timed fire.*
1 score at target X (sitting or kneeling).	1 score at target X (sitting or kneeling).
1 score at target Y (prone).	1 score at target Y (prone).

(3)

Slow fire.	*Timed fire.*
2 scores at target X (sitting or kneeling).	2 scores at target X (sitting or kneeling).
2 scores at target Y (prone).	2 scores at target Y (prone).

ADDITIONAL MATCHES.

1. Bull's-eye matches.

2. The two best shots from each company. Ten shots at one range. To be decided by the best score.

3. The two best shots from each company. One skirmish run. To be decided by best run.

4. Disappearing targets, thirty seconds' exposure. Fire at will. Each competitor to have his own target. To be decided by greatest number of hits.

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PISTOL CONTESTS.

At posts where there are at least two troops of cavalry, pistol matches by teams may be substituted for carbine contests, or combined therewith. The following programmes are suggested:

DISMOUNTED COURSE.

(1)

Timed fire.	*Rapid fire.*
1 score at 25 yards.	1 score at 15 yards.
1 score at 50 yards.	1 score at 25 yards.

(2)

Timed fire.	*Rapid fire.*
2 scores at 25 yards.	2 scores at 15 yards.
2 scores at 50 yards.	2 scores at 25 yards.

(3)

Dismounted course—rapid fire.	*Mounted course.*
1 score at 15 yards.	1 firing to the right, target H.
1 score at 25 yards.	1 firing to the left, target H.

MOUNTED COURSE.

(1)

1 firing to the right at target M (5 targets).
1 firing to the left at target M (5 targets).

(2)

2 firings at target M (2 targets).

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PART IX.

FIRE DISCIPLINE.

CHAPTER I.

MOTION OF BULLETS.

423. When a rifle is discharged the bullet is acted upon by several forces, viz., by the projectile force, by the force of gravity, and by the resistance of the air. The effect of these forces is also modified by other minor forces which influence, often irregularly, the flight of the bullet.

THE PROJECTILE FORCE.

424. The explosion of the cartridge gives rise, by the decomposition of the powder, to a large amount of gas, which, being highly elastic, endeavors to occupy a space much greater than that in which the powder was contained, and consequently exerts considerable pressure in every direction.

The pressure upon the sides of the barrel only sets up vibrations in the metal; that in the direction of the breech induces the recoil, which in turn depends upon the projectile force and upon the weights of the rifle and bullet; that in the direction of the muzzle imparts motion to the bullet, which motion, during the passage of the bullet through the barrel, experiences resistance from the sides of the grooves, from friction against the surface of the bore, and from resistance of the air.

425. The projectile force continues to act while the bullet is in the barrel, causing it to move with an ever-increasing velocity until it reaches the muzzle. The velocity with which the bullet finally issues from the barrel is called the *initial* or muzzle velocity, and is measured by the number of feet it would pass over in one second, provided its rate of motion remained unchanged.

426. If, after leaving the muzzle, the bullet were subjected to no other forces, it would continue to move in a straight line, following the direction of the axis of the bore, which is called the *line of fire*, and with, at all points in its path, a velocity the same as the initial velocity; it would consequently pass over equal spaces in equal times.

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THE FORCE OF GRAVITY.

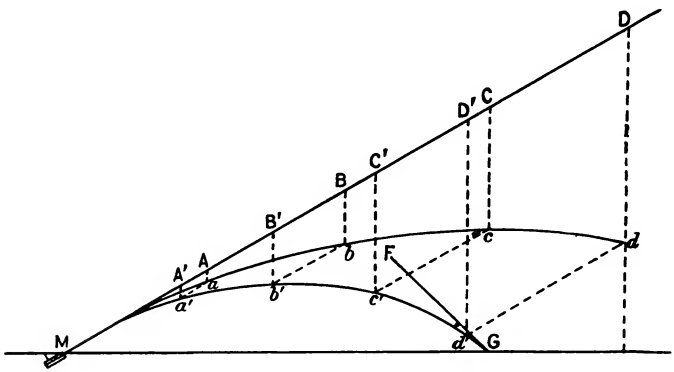
427. Upon issuing from the muzzle, the bullet, which has previously been supported by the barrel, is influenced by the force of gravity.

428. This force draws all unsupported bodies toward the earth, and if it were not for the resistance of the air, would cause them, whether light or heavy or whatever their shape, to fall from any height in a straight line to its surface with a continually increasing velocity.

Under this influence all bodies would pass over about 16 feet in the first second of fall, about 48 feet in the second, or 64 feet in two seconds; about 80 feet in the third, or 144 feet in three seconds; about 112 feet in the fourth, or 256 feet in four seconds, and so on; the distance passed over in any second being always about 32 feet more than in the preceding second.

429. The effect of this force is to change the direction of a bullet after it has left the muzzle of the rifle. Let *M* (Plate XXXIX) be the muzzle of the rifle, *MD* the direction of the line of fire, and suppose that the

PLATE XXXIX.



bullet leaves the rifle with a velocity such that it will, considering only the projectile force, be at *A* at the end of one second; it will then be at *B*, *C*, and *D*, at the end of two, three, and four seconds, respectively, each of the distances *AB*, *BC*, and *CD*, being equal to *MA*.

430. Let a bullet be dropped from *A;* considering only the force of gravity, it would at the end of one second be at *a* (*Aa* being equal to 16 feet), and if bullets were dropped from *B*, *C*, and *D*, they would at the end of two, three, and four seconds, respectively, be found at *b*, *c*, and *d*; the distances *Bb*=64 feet, *Cc*=144 feet, and *Dd*=256 feet.

431. The action of the force of gravity upon bodies in motion is the same as upon those at rest, and it will therefore effect the bullet upon

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leaving the muzzle in the same manner as it does those let fall from the points A, B, C, and D.

Under the combined action of the projectile force and the force of gravity, a bullet will therefore at the end of one, two, three, and four seconds, instead of reaching A, B, C, and D, be found at the points a, b, c, and d, respectively; and if these points and M be joined by a line we will have the path followed by the bullet under the combined action of these forces.

This path is called the *trajectory in vacuo* (the resistance of the air having been neglected) and all points of it are below the line of fire. Its curvature is turned toward the earth and is much more pronounced as the initial velocity of the bullet is less.

432. The effect of the force of gravity, it is seen, is to change the path of the projectile from a straight to a curved line, and by finally bringing it to the earth to limit the distance passed over.

THE RESISTANCE OF THE AIR.

433. The bullet in its passage through the air displaces it in every direction; the resistance offered by the air to this displacement depends upon the shape of the bullet and its rate of motion, and is much greater for those bullets having a high than a low velocity. Its effect is to gradually diminish the velocity of the bullet, and to cause the spaces over which it passes in equal times to continually grow less and less.

434. This diminution of velocity will cause a ball issuing from a rifle with an initial velocity which would have brought it (neglecting the force of gravity) at the end of one second to the point A (Plate XXXIX) to only reach some point as A', and instead of reaching B, C, and D, at the end of two, three, and four seconds, to be found at B', C', and D', respectively, $C'D'$ being less than $B'C'$, $B'C'$ less than $A'B'$, and $A'B'$ less than MA'.

435. This diminished velocity that the bullet has at any point is called the *remaining velocity*, and is measured by the number of feet that it would pass over from that point in one second, provided it continued to move at the same rate as at the beginning of the second.

COMBINED EFFECT OF THESE FORCES.

436. Under the combined action of these forces it is evident that the bullet at the end of one second, instead of being found on the vertical line through A (as when the resistance of the air was neglected) will be found somewhere on the vertical line through A': but since in the case of lead bullets falling for only a few seconds (the velocity of fall being very small) the resistance of the air does not materially alter the effect of the force of gravity, the bullet will be at a', $A'a'$ being equal to Aa, and at the end of two, three, and four seconds be at b', c', and d', respectively, $B'b'=Bb$, $C'c'=Cc$, and $D'd'=Dd$.

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Joining the points M, a', b', c', d', we will have the path followed by the bullet under the influence of the projectile force, the force of gravity, and the resistance of the air. This path is called the *trajectory;* it is more curved than the trajectory in vacuo; its latter part more than the first part, and its highest point is farther from the rifle than from the point where it meets the ground.

437. The angle made by the line of fire, or axis of the bore prolonged with the horizontal plane (thus, *DMG*, Plate XXXIX), is called the *angle of fire*, and that made by the last element of the trajectory with the ground (thus, *FGM*, Plate XXXIX), *the angle of fall.* The angle of fall is always greater than the angle of fire. The vertical plane passing through the line of fire is called the *plane of fire.*

438. The *range* is the distance from the muzzle of the rifle to the point where the trajectory pierces the horizontal plane through the muzzle. The range increases to its maximum limit as the angle of fire is increased.

The range also depends upon the shape and weight of the bullet (which influences the resistance of the air) and upon the initial velocity.

439. As the preceding paragraphs have shown that no part of the trajectory is a straight line, and that the bullet in its flight continually falls farther below the line of fire (*MD*, Plate XXXIX), it is evident that if the line of fire be directed on any object the bullet will not hit it, but will strike below it, and this departure of the bullet from the object will be greater as the distance of the object from the rifle is increased.

To counteract this fall of the bullet, the line of fire must evidently be directed as much above the object as the bullet could strike below it if the line of fire were laid directly upon the object.

440. If the barrel were of uniform thickness and the firer, by looking along its upper surface, were to direct the line of fire at any particular distance above an object, the mark would be lost sight of and inaccuracies would result both as regards elevation and direction.

It is, therefore, essential that the object be kept in view as the direction of the line of fire is altered, and to accomplish this the eye must be so far raised above the breech as to see the object over the muzzle of the rifle.

441. To fix the position of the eye when the line of fire is properly directed for an object at different distances, the rear sight is employed. The straight line passing through the bottom of the notch of the rear sight and the top of the front sight is called the *line of sight*, and the angle which it makes with the line of fire is called the *angle of sight.*

442. The graduations on the rear sight are so determined that when the eye is placed as indicated for any range, and the corresponding line of sight directed upon an object at that distance, the line of fire will pass as far above the object as a bullet, in traversing the distance to the object, would fall below the line of fire.

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CHAPTER II.

VARIATIONS IN THE TRAJECTORY.

443. In the preceding discussion the trajectory, throughout its whole extent, has been considered as situated in the plane of sight, and the angle of sight as only affected by the three principal forces which act upon the bullet. In reality, however, there are many other forces affecting the flight of the bullet, which cause changes in the form and position of the trajectory and make necessary modifications of the relative positions of the lines of sight and fire.

444. These influences belong to two general classes, those incident to the rifle and ammunition, and those due to the peculiarities of the atmospheric conditions.

THE TRAJECTORY AS AFFECTED BY THE RIFLE AND THE AMMUNITION.

445. THE WANT OF SYMMETRY IN THE BREECH-LOADING PARTS.—The different parts of the breech system which receive and sustain that portion of the projectile force which induces the recoil not being symmetrically disposed with reference to the line of fire, a slight change is effected in the direction of that portion of the force which propels the bullet, and a deflection of the bullet therefore caused which always takes place in the same direction for all ranges, and is constant for any single range, but increases in amount as the range is increased.

446. With most small arms the deviation is but slight, and as the sighting of the magazine rifle and carbine has been determined by experimental firing, its effect has been eliminated.

447. THE RIFLING.—The grooves being inclined to the axis of the barrel, tend by their resistance to retard the passage of the ball, and therefore to diminish its initial velocity and also to give to the bullet a motion of rotation around its longer axis. The initial velocity of this rotation—that is, its velocity at the muzzle of the piece—will depend upon the initial velocity of the bullet and the distance measured in the direction of the axis of the piece required for one complete turn of the rifling. It will be expressed by the quotient of the former by the latter quantity.

448. The resistance of the air, combined with this rotation of the bullet, causes the axis of the bullet to approach the trajectory, its point to remain in advance throughout its flight, and also produces a lateral motion of the entire projectile. This lateral deviation of the bullet receives the name of drift; its direction is determined by that of the rifling.

449. The amount of drift increases as the range is increased, but in a more rapid ratio; for the shorter ranges, where the velocity of the bullet

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is changing rapidly for each 100 yards increment of the range, this ratio is continually increasing, becoming more fixed in value, as with a longer range the change in velocity for each additional 100 yards becomes more uniform. The projection of the trajectory on the ground will then, for the shorter ranges, be a curve which becomes flatter as the range is increased, but which continually departs from the plane of fire.

450. For the United States small arms the rifling turns toward the right; the drift should, therefore, be in that direction.

451. VARIATIONS IN THE DIMENSIONS OF THE DIFFERENT PARTS.—The manner of their fabrication causes some slight variations in the dimensions of the different parts of small arms, which can be limited in amount, but practically can not be entirely eradicated.

452. The variations which particularly affect the trajectory are those in the dimensions of the bore, the grooves, and the chamber; these mainly affect the initial velocity, and, therefore, the range and height of the trajectory at different points; also variations in the exterior dimensions of the barrel and of the bands, which may cause the latter to bind, to a greater or less extent, at the time of discharge, and variations in the thickness of metal at different points of the barrel; these may cause horizontal as well as vertical deviations of the bullet.

In addition to these variations others are incident to the manner of assembling, to the fit of the barrel in its bed in the stock, and to the different parts of the sights.

453. The deviation of the bullet produced by the combination of these conditions will, for the same rifle, generally take place in the same direction for all ranges, but to an amount that varies from range to range.

454. As the deviation incident to the arm itself usually varies in extent, and often in direction, for different rifles, a knowledge of the peculiarities of one is no guide to the usual firing of another; for the soldier to make any considerable advance in marksmanship, it is, therefore, not only essential that he should have an intimate acquaintance with the weapon he generally uses, but if he desires his practice to present uniform results, should confine it to that particular arm.

455. VARIATIONS IN THE AMMUNITION.—The manner of their fabrication causes some slight variations in the dimensions of the cartridge case and bullet, and in the weight of the powder charge; these affect the accuracy of fire in different ways.

456. Changes in the exterior diameter of the cartridge shell affect the closeness with which it is supported by the walls of the chamber, and, therefore, alter the amount of force lost in expanding it; this results in diminishing, to a greater or less extent, the velocity of the bullet.

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Upon the interior diameter and upon the length of the case depend the amount of compression which the powder receives; this and the degree of crimp to the case around the bullet also affect the initial velocity.

457. Changes in the weight of the bullet, besides influencing the initial velocity, also independently affect the flatness of the trajectory and velocity of the bullet at different points. Changes in the diameter of the bullet cause it to fit more or less tightly the bore of the gun; this influences the velocity and, independently of that, the accuracy of fire. The greater or less uniformity in the bullet's shape and in the disposition of the metal also exerts its influence upon the trajectory.

458. The kind and amount of powder used, the density of loading, and its comparative dryness at that time, all affect the initial velocity.

459. These different influences incident to the ammunition may cause, even with cartridges manufactured with the greatest care and upon the same day, variations, when fired from the same gun, as great as 40 feet in the initial velocity. The average result, as determined by very extensive firing, extending over a long period, is to produce a mean change of about 20 feet in the initial velocity with the modern smokeless powder.

THE TRAJECTORY AS AFFECTED BY THE ATMOSPHERIC CONDITIONS.

460. In treating this subject, it has been endeavored to consider the influences affecting the trajectory in no greater detail than can be easily comprehended by the average soldier, and to suggest only such corrections as can be readily applied to a military rifle, with military sights, and by any enlisted man.

461. The subject can then be best considered under three heads: (1) The effect of moisture and temperature upon initial velocities. (2) The effect of variations in the density of the air. (3) The influence of the wind upon the lateral deflections of the bullet and upon the range.

(1) *The effect of moisture and temperature upon initial velocities.*

462. It has been stated that the comparative dryness of the powder at the time of loading influenced the initial velocity; this dryness is very easily affected, the powder readily absorbing moisture from the air if left exposed to its influence, or being quickly dried by exposure in a warm, dry atmosphere.

463. The amount of moisture in the air affects the initial velocity also by influencing the character of the residuum deposited on the surface of the bore. This presents more or less resistance to the movement of the projectile through the barrel. The greater the absolute amount of moisture present, the softer does the deposit become, and the easier does the

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projectile pass through the bore. On moist, damp days the bullet will therefore strike high, and a decrease in the elevation will be required; on dry days the reverse effect will obtain.

464. As the temperature of the air increases, the general effect is to increase the absolute amount of moisture, and therefore, for the reasons given above, to increase the initial velocity.

Increase of temperature also increases the initial velocity, in that less of the work of the powder gases is absorbed in heating the barrel, and a greater amount is available for its effect upon the bullet. This will produce, in cold weather, a considerable variation between the earlier and later rounds, which in warmer weather is not so noticeable.

The greater or less heating of the barrel will also cause appreciable variations in the relation of the caliber of the bore and the diameter of the bullet, which will affect the initial velocity.

(2) *Density of the air.*

465. The resistance of the air to the flight of a projectile varies directly with its density; the density is dependent upon the altitude above the sea and upon the local changes in the barometric pressure, the temperature, and the degree of moisture.

466. For every increase of height above the level of the sea, provided the temperature remains constant, the density of the air diminishes; an increase in the range for any particular adjustment of the sights will therefore result. At 500 yards this increase is about 5 yards, at 800 yards about 10 yards, and at 1,000 yards about 14 yards for each increase of 1,000 feet in elevation.

467. At any constant altitude above the level of the sea the changes in the height of the barometer will produce effects upon the range which would require consideration if firing special match rifles, but for military practice would involve a refinement not generally practicable.

468. Temperature, however, varying considerably, as it may during a single day's firing, and varying also at different seasons from much below zero to more than 100° above, effects marked changes in the density of the air, and can not be neglected.

As the temperature increases, the density of the air decreases; the resistance which it offers to the flight of the bullet will, therefore, be decreased and the range correspondingly increased. The approximate change in the range for each change of 10° in the temperature is about 3 yards at a range of 500 yards, about 6 yards at 800 yards, and about 8 yards at a range of 1,000 yards.

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(3) *The effect of the wind.*

469. In considering the action of the wind upon the flight of the projectile the rifleman is at once met with a twofold problem. He must determine the probable effect upon elevations and upon deflections or deviations.

470. Assuming that the wind remains uniform in force, variations in its direction produce, at times, marked changes in its relative action upon the projectile, both as to range and as to deflection.

471. To arrive at any satisfactory conclusion, it is necessary to consider the wind force resolved into two component forces, one acting in the plane of fire (i. e., parallel to it), the other at right angles to it. It is then possible to make the required allowances, essentially as if two independent forces were acting, each having a constant uniform direction, but a variable strength.

472. The component of the wind force acting in the plane of fire is termed *accelerating* if the wind is from the rear, and *retarding* if the wind is from the front; it affects the range in the manner indicated by the designation.

473. The component acting at right angles to the plane of fire is called *deviating*, and is to the right or left, as the wind is from the left or right, respectively, of the plane of fire.

474. The direction of the wind is, for convenience, expressed by a clock-face notation, the clock face being supposed to be held in the hand of the firer with the hour XII toward the target or other object of aim and the hour III at the right hand. A wind blowing directly from the front (that is, from the direction of the target) is called a XII o'clock wind, one directly from the left and across the line of fire a IX o'clock wind, and so on.

475. The direction of the wind can be obtained by observing its effects on the smoke, on trees or grass, on flags, or upon the portion of the head or face impinged upon.

476. The force of the wind is designated in miles per hour, and can be obtained from the readings of an anemometer. It can be judged approximately by observing the manner in which the boughs of trees and flags are affected; also by the sensation produced upon the face and other portions of the body. If the estimates thus formed are frequently corrected by anemometer readings, they will soon gain greatly in accuracy.

477. The following table gives the proportions of the rectangular component forces acting when the wind is from different directions. The force of the wind is assumed as unity, and the components are given in the nearest simple vulgar fraction.

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Table.

Direction.	Accelerating.	Retarding.	Deviating to the left.	Deviating to the right.	Direction.	Accelerating.	Retarding.	Deviating to the left.	Deviating to the right.
XII	—	1	0	—	VI	1	—	0	0
XII½	—	1	¼	—	VI½	1	—	—	¼
I	—	⅞	½	—	VII	⅞	—	--	½
I½	—	¾	¾	—	VII½	¾	—	—	¾
II	—	½	⅞	—	VIII	½	—	—	⅞
II½	—	¼	1	—	VIII½	¼	—	—	1
III	0	—	1	—	IX	0	0	—	1
III½	¼	—	1	—	IX½	—	¼	—	1
IV	½	—	⅞	—	X	—	½	—	⅞
IV½	¾	—	¾	—	X½	—	¾	—	¾
V	⅞	—	½	—	XI	—	⅞	—	½
V½	1	—	¼	—	XI½	—	1	—	¼

478. The foregoing table is given in a more convenient form in the following dial:

Dial showing the Approximate Value of the Deviating, Accelerating, and Retarding Components of the Wind with Reference to the Plane of Fire, for every 15°, corresponding to the Half Hours of the Clock Dial.

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479. An examination of the foregoing table or dial shows that slight changes of direction, when the wind is near XII or VI o'clock, make considerable changes in the value of the deviating components, while but little change occurs in the values of the retarding or accelerating components. Hence, with the wind varying between XI and I o'clock, or between V and VII o'clock, the deviating allowance must be carefully observed, while the elevation remains comparatively unchanged. On the other hand, when the wind is between II and IV o'clock, or between VIII and X o'clock, the deviation allowance will be changed but little, while the change in the elevation may be considerable.

480. The lateral deflections produced by the wind have been found to be practically directly proportional to the deviating component of the wind. The amount of deviation produced by one mile of wind, acting at right angles to the plane of fire, is called the *coefficient of deviation.*

481. To fully determine the effect of a side wind upon the bullet of the magazine rifle would require an extended course of firing, for which opportunity has not yet occurred. It is known, however, that the deviation is greater than for the caliber .45 bullet.

482. The effect of the wind upon the range has not yet been satisfactorily solved; but from computations based upon the most reliable data and methods, it would appear that a ten-mile wind acting in the line of fire will alter the range about 7 yards at 500 yards, about 14 yards at 800 yards, and about 20 yards at 1,000 yards.

483. At extreme distances, over 3,500 yards, the wind has a marked effect on the ranges. Experiments with an arm having a caliber and bullet very similar to the U. S. magazine rifle showed that a strongish rear wind increased the range about 250 yards over that obtained with the same elevation on a calm day.

CHAPTER III.

THE EFFECTS OF FIRE.

VELOCITY AND RANGE.

484. The velocities, at different distances up to 2,000 yards, for the bullet fired from the rifle and carbine are given in Tables I and II of Appendix A.

485. For the shorter ranges the relative loss of velocity is greater for those bullets having originally the greater initial velocity, and is also greater for a light than for a heavy bullet having the same cross section.

486. This decrease in the remaining velocity becomes much less as the range is increased beyond 1,500 yards, and at different distances approaching the maximum range the remaining velocities of the same bullet are

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sensibly the same, the loss of some of the velocity originally imparted by the projectile force being to a great extent compensated for by that acquired by the bullet in falling through the height due to the increased elevation. At these great ranges the remaining velocity is not affected by slight changes in the powder charge, the variations in the initial velocity being neutralized by the resistance of the air long before the ultimate range is reached.

487. The extreme range is also but slightly influenced by small changes in the powder charge, but very greatly by an alteration in the weight of the bullet; a heavier bullet of the same caliber being better able to overcome the resistance of the air.

The maximum range computed for the .30-caliber rifle is 4,066 yards; angle of elevation, 44°; time of flight, 34.6 seconds; and for the carbine, 4,016 yards; angle of elevation, 44°, and time of flight, 34.3 seconds.

488. The energy of the bullets from the magazine rifle and carbine is given in Tables I and II, Appendix A.

489. Dependent mainly upon the changes in velocity, three zones of effect are noted in examining the penetration of the small-caliber bullet. The explosive zone, where an effect of that nature, due to the lateral or centrifugal transmission of the shock of impact, is produced, occurs for high velocities, and therefore is confined to the shorter ranges, not exceeding about 300 or 400 yards. Following this latter range, up to about 2,000 or 2,500 yards, the bullet perforates more cleanly, making generally a smooth, clear hole in human bodies as well as in other objects that it completely perforates. At more extreme ranges the effect of the bullet is to produce a contused wound.

490. At very short ranges the bullet is more generally deformed than at a longer range, and consequently in such substances as sand, distant only a few feet, the penetration is very slight, the bullet jacket tearing off or spreading.

491. A mild-steel or wrought-iron plate slightly under ½ inch thick, or a hardened-steel plate 0.25 inch thick, will not be penetrated at 100 yards. At 500 yards the steel plate need not exceed 0.1 inch in thickness to resist the bullets.

TIME OF FLIGHT.

492. The time of flight for the rifle and carbine bullet, for ranges from 100 to 2,000 yards, is given in Tables I and II of Appendix A.

For the magazine rifle the bullet is overtaken by the sound of discharge at a distance of about 1,100 yards.

493. In consequence of the variations in the different parts of the small arm and cartridge, bullets fired with a constant aim, from the same gun, on the same day, and under similar meteorological conditions, will strike

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points of the target more or less widely separated. The degree of concentration of the hits will depend upon the extent of these variations, and will therefore afford a measure of the accuracy of the piece.

494. The central point of a cluster of shots is called the *center of impact*, the horizontal distance of a shot from this point its horizontal deviation, and the vertical distance the vertical deviation. The mean of the horizontal deviations of all the shots will measure the accuracy of the piece in a horizontal direction, and the mean of the vertical deviations its vertical accuracy.

495. The influences affecting the accuracy of the piece, whenever a great number of shots is considered, cause the mean vertical deviation to exceed the mean horizontal deviation.

DANGEROUS SPACE.

496. The trajectory cuts the line of sight in two places, the first near the muzzle, the second at the point aimed at (supposing that point to be struck); between these two points all portions of the trajectory are above the line of sight. The heights of different points of the trajectories, for different ranges, above the corresponding lines of sight are given for the magazine rifle and carbine in Appendix A, Tables IV and V.

497. If an object situated on horizontal ground extends both above and below the point aimed at, there will be a distance in front of it where

PLATE XL.

Fig. 1.

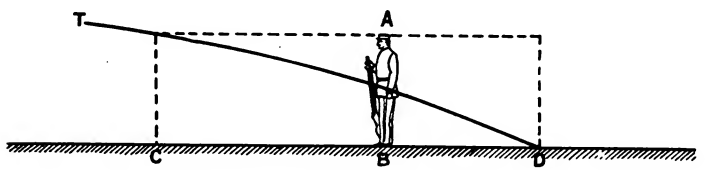
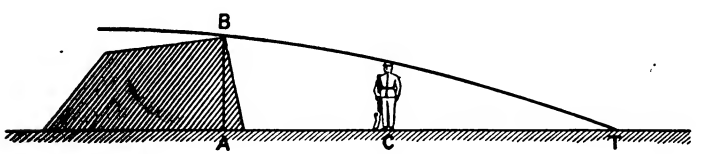


Fig. 2.



the trajectory will not be above its highest point and some distance beyond it before the trajectory will meet the ground at the level of its lowest

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point; it is therefore evident that for this trajectory there will be a space in the direction of the plane of fire rendered dangerous for the object. Thus in Plate XL, fig. 1, for an object of the height *AB*, and a trajectory *TD*, the dangerous space will be the distance *CD*, and if occupying any point of this space the object *AB* would be hit by a bullet following the trajectory *TD*.

498. The extent of the dangerous space depends upon the height above the ground from which the fire is delivered, upon the flatness of the trajectory, the height of the object and its distance from the origin of fire, and upon the configuration of the ground where it is situated.

499. When other conditions are the same the dangerous space will be greater for fire delivered from a lying than from a standing position. It will be greater when the object is a soldier standing than for one lying down or kneeling and still greater for a mounted man.

500. The dangerous space for the magazine rifle fired lying down against infantry kneeling and standing and against cavalry at ranges from 100 to 2,000 yards is given in Table III of Appendix A. The dangerous spaces are calculated under the supposition that when firing standing the muzzle of the piece is 56 inches from the ground and when firing lying down 12 inches; that the height of a man kneeling is 3 feet 6 inches and of one standing 5 feet 8 inches, and that the height of a man mounted is 8 feet; also that aim in all cases is taken at the middle point of the object.

501. When the distance of the highest point of the trajectory from the ground does not exceed the height of the object the entire distance from the muzzle of the piece to the point beyond the object where the shot strikes the ground will constitute the dangerous space.

502. With the magazine rifle at 2,500 yards, from 5 to 10 per cent of the bullets ricochet off turf; at 3,000 yards they all bury in turf, but a few will ricochet on very hard ground.

503. If the ground where the object is situated is not horizontal its slope will very materially influence the extent of the dangerous space. If the object is situated on rising ground the angle of fall will be increased and the dangerous space, therefore, diminished; but if on falling ground the dangerous space will be increased as the slope of the ground becomes greater, until its inclination exceeds that of the tangent to the trajectory at the point which marks the limit nearest to the firer of the dangerous space for horizontal ground.

504. Thus in Plate XLI, for an object of the height *AM*, and the trajectory *TE*, to which *tM* is the tangent at *M*, the dangerous space on horizontal ground will be *Ah*, on rising ground *Ab*, on falling ground *Ac*, which will reach its maximum *Ad*, for ground *AD* parallel to the tangent *tM*. When the slope increases beyond this limit, as *AE*, the height of the

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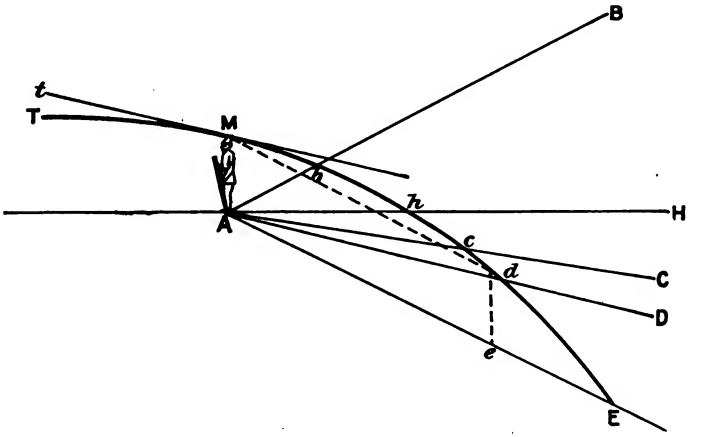
trajectory between A and e will exceed AM, and the dangerous space will be reduced to the position A, and to the distance eE, the distance Ae not being covered by the trajectory.

PLATE XLI.



505. For short ranges, when the trajectory is quite flat and the angle of fall small, the dangerous space is greatly increased by even a slight slope of the ground below the line of sight. As the range is increased this effect is reduced. For the trajectory of 600 yards a downward slope from the nearest point of the dangerous space of one on fifty but slightly more than doubles the dangerous space, and for the 1,000 yards trajectory increases it only about 25 per cent. At this latter range a slope of one on twenty would have the effect of doubling the dangerous space.

DEFILADED SPACE.

506. An obstacle of sufficient thickness to prevent the penetration of the bullet will protect from fire the space extending from its foot to the point where the bullet, which grazes its crest, meets the ground. The extent of the defiladed space will depend upon conditions similar to those which affect the dangerous space, therefore upon the height of the shelter and upon the curvature of the trajectory, which is in turn determined by the range.

507. In Plate XL, fig. 2, the distance AT will represent the defiladed space for the trajectory BT, and an obstacle of the height AB. The soldier beyond T would be struck by bullets passing a slight distance over the crest B; he would be partly sheltered between T and C (the dangerous

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space for this trajectory), and would be completely protected throughout the distance *AC*.

508. If the height of the shelter is less than that of a man standing, only a partial protection will be afforded, and complete shelter can only be attained by the soldier kneeling or lying down, but even in such cases the efficiency of the fire will be greatly diminished in that the flight of a portion of the bullets will be arrested.

509. If the ground, instead of being horizontal, slopes upward behind the shelter the defiladed space will be diminished; if it slopes downward it will be increased.

CHAPTER IV.

INFLUENCE OF GROUND.

510. The apparent crest of rising ground is the point where the line of sight makes a tangent with the ground, and as the line of sight changes for each position, there may be many apparent crests to the same piece of ground.

Troops defending a slope should always see its foot to prevent there being a dead angle where the enemy may collect.

It may be necessary, for this purpose, to advance the firing line somewhat down the slope, to what is called the military crest as distinguished from the true crest.

Placing troops in this manner, two or more lines of infantry fire from shelter trenches can be obtained, and the artillery brought into action on the crest. In order to hit any one of these, the fire of the attack must be specially directed on it, from the small depth of the dangerous zones on such (rising) ground.

In this case the advanced position of the firing line may be said to arise from the necessity for a clear view of the foot of the slope; but cases may arise where the slope of the ground is such that this disposition is deliberately chosen in order to use two tiers of fire and to utilize the crest to cover reserves and artillery.

The infantry line being well down the slope, the enemy would have no reason to fire on the crest; hence the reserves of the defense could safely be kept close in rear of this cover, and from their elevated position they can see when and where their action will be most opportune.

While the firing line forces the assailant to deploy and to bring up his reserves in plain sight and under fire, the reserves of the defense can be moved safely and unseen on the plateau, and, if necessary, can be used to fire over the heads of those in front.

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The position of resistance can be taken so far in front of the crest that artillery in its rear, on the crest, will be safe from the infantry fire of the attack as long as this position is held.

Enough has been said to indicate the great importance of knowledge of the ground and of its employment, both defensively and offensively. "Knowledge of the ground is no less indispensable to the attack than to the defense—here to profit by strong points, there to avoid them. The ground dictates to the defense the points of resistance and the tactical dispositions; it indicates to the attack the direction in which an assault has no chance of success, and that where it may succeed. Tactical dispositions ought to be based on the properties of the ground; an ideal formation on horizontal ground would be annihilated if it were blindly placed on intersected ground; there is no panacea applicable to all cases."

The Germans enumerate among the qualifications of an officer, "correct appreciation of the ground."

The French regulations say, regarding the occupation—

First. *Ground falling with respect to the enemy's line of sight:* "The most favorable ground for defense is one which presents, in front of the firers, a clear glacis, forming a free field of fire of great extent, inclining gently toward the enemy.

"The greater the fall of the ground in the rear of the crest, the better are troops on this reverse slope sheltered from the fire of the attack. To cover steep slopes with fire, it must be delivered at long ranges, which lessens its efficacy.

"Slight undulations of the ground hide troops from the view of the enemy, but not from his fire coming over the crest.

"The firing line should be sufficiently in advance to overlook the ground, and to leave in its rear a sufficient mask to protect the reserves.

"A position which forces the artillery of the defense to come very close to the firing line, while that of the attack can fire from its normal distance, is defective or badly occupied.

"If the ground in front of the crest has a steep slope, stages of fire can be used if the fire of the upper lines does not endanger the lines further down the slope.

"Troops in the rear of the crest must not think themselves out of reach of the enemy's fire because they are out of his sight. If there is no shelter, they should take formations with a narrow front. They remain at a distance when the enemy fires at long ranges, and as he advances they approach the crest to avoid the effects of his fire, which falls farther to the rear as the ranges decrease. This forward movement suits the tactical necessities of the fight.

"Observation of the points where the enemy's bullets fall furnishes a useful indication of the positions to be avoided by the reserves, because

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these points depend on the form of the ground, and not on the will of the firers.

"In choosing a second line of defense, when it is not determined by the nature of the ground and the existence of natural obstacles, the distance to which it will be possible to sweep the slopes in advance of the crest must be considered.

"It is at these distances, measured beforehand, that the shelter trenches or other works of this second line must be constructed. They will so much the better permit of stopping pursuit and reestablishing the fight as the enemy's artillery comes more within the efficacious zone of infantry fire, which will prevent its coming into action."

Second. *Ground rising with respect to the enemy's line of sight:* "Ground of this nature is favorable to the carrying out of the fight principally by the firing line.

"On such ground, column formations of any kind are eminently vulnerable and line formations with intervals are preferable.

"The distance between the different lines may be less as the inclination of the ground is greater.

"Troops in rear of the firing line will, as a rule, suffer only from fire especially directed on them.

"They ought, therefore, to use every accident of the ground to cover themselves; if there are no shelters, they will find that, in joining the firing line, their best protection is an uninterrupted forward movement, rapidly crossing the diminished dangerous zones. This also enables them, by a single forward movement, to get away from any regulated fire of the enemy.

"Finally, it should be pointed out that such ground has the grave disadvantage of exposing all the defensive dispositions to the enemy's view, who can see all the movements made in the interior of the position."

In point of fact the whole question of the best method of occupying ground is not to be settled in the study on theoretical grounds. Each case must be worked out on the ground to which it is to be applied; and the skill of the commander is shown by the manner in which his dispositions are adapted to the ground.

CHAPTER V.

DEDUCTIONS.

EMPLOYMENT OF FIRE IN ACTION.

511. LIMIT OF INDIVIDUAL FIRE.—The different kinds of fire most appropriate for the various stages of an action depend upon the size of the object, especially as compared with the height of the shot group and upon the greater or less certainty of its distance; the degree of the soldier's

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proficiency with his weapon; the moral condition of the troops; the amount of ammunition; and finally upon the accuracy of fire of the rifle, and the flatness of the trajectory at different ranges.

The distances beyond which the fire upon different objects will produce but a slight effect can be only approximately stated; the ability of the men, the state of the weather, the stage of the action, may all cause considerable modifications.

As a general rule, however, the fire of the average individual soldier will not prove effective without the expenditure of considerable ammunition, when directed upon a single man, lying down, at a greater distance than 500 yards; upon a man kneeling, beyond 600 yards; upon one standing, beyond 700 yards; upon a mounted man, beyond 800 yards; or upon a squad, lying down, beyond 1,000 yards. At the latter distance the fire would usually be effective against a line of skirmishers (5-yard intervals), and up to 1,200 yards against a line of skirmishers with intervals reduced to 1 yard. Fire upon a body of men, in closed ranks, of the width of a company front (12 to 15 yards), will generally be effective up to 1,000 or 1,200 yards; upon a body of men with a front of 20 or 25 yards, or upon a section of artillery up to 1,200 or 1,300 yards; upon columns of companies, or small, compact bodies of artillery or cavalry up to 1,500 or 1,800 yards. Beyond these distances aimed fire will not usually be effective, and should not be attempted except upon large bodies of troops. If the supply of ammunition will permit the expenditure of a great number of cartridges, unaimed or, more properly, curved fire may be conducted up to the extreme limit of rifle range by troops in position acting in the defensive. In the case of troops forming for an assault or advancing to the attack of other troops under cover, the employment of such fire is decidedly disadvantageous.

When the enemy is at only a moderate distance (600 or 800 yards), the flatness of the trajectory and, if the ground is favorable, the added effect of the ricochet render the slight errors which may be made in the estimation of the range of but little importance. When he approaches within the continuous dangerous space of the rifle, no further changes in the adjustment of the sight should be made as his distance varies.

For longer ranges, not exceeding those where an estimation of the distances can be depended upon to within 100 yards, the depth (100 yards) of the ground well covered by the fire of a body of men will still render the fire effective even if the correct range is not assumed. That the effect of the ricochet may not be lost, care should be taken not to overestimate the distance, and to aim at the feet of the enemy. This selection of a point of aim is especially advantageous, as, when it is employed, a greater number of the bullets in the shot group will usually prove effective, and also the

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error so common in the heat of action of taking too full a sight is neutralized.

For ranges of 1,000 to 1,200 yards, when the distance is a matter of some uncertainty, and especially when the enemy is in motion, the simultaneous employment by different bodies of men of two or more elevations possesses some advantage. If two different sights are chosen, they should differ by 100 yards, one 50 yards greater, the other 50 yards less than the estimated distance; at still greater distances three elevations may be selected; one should be that of the estimated range, one 100 yards greater, the other 100 yards less.

The fire will, of course, be less concentrated, but a much greater extent of ground will be covered. The employment of different elevations by small bodies of men should never be permitted.

512. VOLLEY FIRE.—For troops behind shelter acting on the defensive, the employment of volley firing possesses many advantages. It enables the officers to govern the direction of the fire and control its extent and the expenditure of ammunition. It readily permits the officer to regulate the adjustments of the rifle sight and to require all to adopt the one deemed most appropriate; and, finally, it affords the officer the best means of retaining a full control over his men, an element of great importance, especially in the case of undisciplined troops. As the enemy approaches toward the distance from which his final rush may be expected, or even before that period, if into ground affording little or no shelter, the volley fire of the defensive should be replaced by independent fire, conducted at first slowly and deliberately, and finally pushed to its utmost limit.

Volley firing can be most advantageously employed to meet the earlier stages of an infantry assault, or to resist, either in line or rally, a sudden attack of cavalry. It can be used earlier in the action in assisting the officer noticing the relative positions of the hostile forces and of the dust raised by the simultaneous fall of many bullets, in determining the corrections that may be required in his estimate of that distance.

Its moral effect upon the enemy when at some distance also exceeds that produced by independent fire, and may therefore unduly hasten their deployment.

For the offensive, volley firing should be conducted by troops especially selected and posted on the flanks of the attacking force or upon some dominant position in the rear. It can then be employed to great advantage at long ranges and before the attacking force is fully engaged. Its use by the attacking force itself should also be maintained as long as possible, as it keeps the men well in hand, affords an interval when commands can be heard, and permits the officers to observe the effects of the fire and to make such changes as may be advisable in the disposition of the troops, and to reestablish calmness and steadiness among the men. At the latter stages of

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the assaults, the firing should be conducted continuously and as rapidly as possible, its effectiveness being principally due to the flatness of the trajectory rather than to any great accuracy of aim. After a position is carried by troops having orders not to advance beyond a certain point the employment of volleys against a retreating enemy is advantageous, and will quickly bring the attacking force under the complete control of its officers.

513. LONG-RANGE FIRE.—The distances at which fire should be opened depend greatly upon the supply of ammunition and the opportunities for replenishing it, the nature of the ground, and the size and tactical importance of the objective. Long-range fire should generally be employed by troops acting on the defensive, particularly if in a permanent position, when the supply of cartridges will be practically unlimited; it should, however, always be under the control of the officers, both as to the time for firing and the number of shots delivered. With its use several lines of fire, one posted above the other, can be directed upon the same portion of an attacking force. It will obviate the necessity of occupying many points which can be covered from the main line. It unduly hastens the deployment of an attacking force, compelling them to take up the formation for combat at a considerably greater distance, and thus makes it harder to correct any erroneous dispositions; besides the casualties occasioned, it impairs the morale, draws their fire at a time when it is not very effective, thereby decreasing their supply of ammunition, and may greatly increase the difficulties attending their occupancy of some important position, though it can not prevent its final accomplishment.

Long-range fire on the part of the offensive should be conducted by specially selected troops; it will be often possible by this means to deceive the defender as to the real point of attack. It possesses great value in turning movements, since it will be possible to suddenly pour in a heavy enfilading fire from a considerable distance. It enables a powerful fire to be concentrated on any point of the defender's line, since troops from distant parts of the field can take part in it, and if the position attacked is on the crest of a dominating plateau, it will so sweep the ground in the rear as to increase the difficulties of bringing forward reenforcements. Its employment by the attacking column is not desirable; it unduly depletes their supply of ammunition and greatly retards the advance, often occasioning serious halts. It will be better not to open fire until within 1,400 yards of the position to be attacked; even then it will not be very efficacious, but it encourages the men, and is in fact very difficult to prevent. Against a retreating force long-range fire is particularly useful, and should be conducted up to its extreme limits.

514. FIRE DISCIPLINE.—Fire discipline, upon which to a great extent the effect of the fire at every stage of the action depends, can not be

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obtained by instruction in rifle firing alone, but requires a thorough drilling and instruction in the various duties of the soldier, a habit of prompt and unquestioning obedience, and an implicit confidence in the judgment of the officers. It is requisite that the officers charged with the control of the fire should be thoroughly self-possessed and able to decide promptly any questions that may arise; that they should be educated in the estimation of distances, be able to determine at a glance the comparative importance of different objectives, and also have a thorough knowledge of the ballistic properties of the weapon with which their men are armed, and of the effects which it may be expected to produce.

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APPENDIX A.

TABLES OF FIRE.

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APPENDIX A.

TABLES OF FIRE.

TABLE I.

Computed tables of fire for U. S. magazine rifle, caliber .30.

Range.	Angle of departure.			Time of flight.	Remaining velocity.	Remaining energy.	Angle of fall.		
Yards.	°	′	″	*Seconds.*	*Feet per sec.*	*Foot-pounds.*	°	′	″
100	0	4	29	.159	1,783	1,553.4	0	4	50
200	0	9	43	.337	1,590	1,235.3	0	11	19
300	0	15	51	.537	1,418	985.2	0	19	55
400	0	23	02	.761	1,265	781.9	0	31	12
500	0	31	35	1.012	1,138	632.8	0	45	55
600	0	41	27	1.288	1,044	532.6	1	4	1
700	0	52	53	1.585	978	467.4	1	25	10
800	1	5	47	1.901	923	416.3	1	49	4
900	1	20	9	2.235	874	373.3	2	15	46
1,000	1	36	1	2.587	831	337.4	2	45	38
1,100	1	53	22	2.957	792	306.4	3	18	55
1,200	2	12	17	3.349	755	278.5	3	55	38
1,300	2	32	47	3.758	721	253.7	4	36	21
1,400	2	55	0	4.186	688	231.4	5	21	28
1,500	3	19	0	4.634	657	210.8	6	11	29
1,600	3	44	24	5.102	628	192.9	7	5	38
1,700	4	12	10	5.603	600	175.9	8	6	10
1,800	4	41	43	6.112	575	161.6	9	13	5
1,900	5	14	8	6.626	550	147.8	10	27	20
2,000	5	49	4	7.231	527	135.6	11	49	38

TABLE II.

Computed tables of fire for U. S. magazine carbine, caliber .30.

Range.	Angle of departure.			Time of flight.	Remaining velocity.	Remaining energy.	Angle of fall.		
Yards.	°	′	″	*Seconds.*	*Feet per sec.*	*Foot-pounds.*	°	′	″
100	0	4	52	.165	1,712	1,432.1	0	05	15
200	0	10	33	.351	1,527	1,139.5	0	12	17
300	0	17	13	.560	1,361	905.4	0	21	38
400	0	25	2	.793	1,217	723.5	0	33	55
500	0	34	14	1.053	1,100	591.5	0	49	37
600	0	44	55	1.337	1,018	506.6	1	08	41
700	0	57	07	1.641	958	448.4	1	30	35
800	1	10	47	1.963	905	400.4	1	55	12
900	1	25	58	2.303	859	360.1	2	22	48
1,000	1	42	34	2.662	816	325.6	2	53	39
1,100	2	0	41	3.041	778	296.1	3	27	46
1,200	2	20	25	3.436	743	269.6	4	05	33
1,300	2	41	47	3.853	709	245.4	4	47	35
1,400	3	4	53	4.289	676	223.6	5	34	09
1,500	3	29	50	4.747	646	203.8	6	25	33
1,600	3	56	9	5.221	618	186.6	7	21	34
1,700	4	25	0	5.724	591	170.6	8	24	24
1,800	4	55	58	6.251	565	156.1	9	33	43
1,900	5	29	34	6.807	541	143.1	10	50	31
2,000	6	5	30	7.388	519	131.4	12	14	47

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TABLE III.

Danger space of U. S. magazine rifle. Fired lying down. Aim at middle of object.

Range.	Against infantry kneeling.			Against infantry standing.			Against cavalry.		
	In front.	In rear.	Total continuous.	In front.	In rear.	Total continuous.	In front.	In rear.	Total continuous.
Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
100	All.	147	247	All.	192	292	All.	231	331
200	All.	104	304	All.	161	361	All.	179	379
300	All.	73	373	All.	106	406	All.	134	434
400	All.	52	452	All.	78	478	All.	102	502
500	49	38	87	105	57	162	All.	78	578
600	30	25	55	56	44	100	78	59	137
700	25	19	44	41	31	72	61	42	103
800	21	16	37	32	27	59	47	33	80
900	17	13	30	25	22	47	35	27	62
1,000	13	11	24	19	18	37	28	22	50
1,100	10.7	10	20.7	16	15	31	21	17	38
1,200	8.4	8	16.4	13.5	13	26.5	17	14.5	31.5
1,300	6.8	6.5	13.3	11	10.7	21.7	15.5	12.5	28
1,400	5.6	5.3	10.9	9.5	9.3	18.8	13.5	11.2	24.7
1,500	4.7	4.4	9.1	8	7.8	15.8	11	10.4	21.4
1,600	4.1	3.9	8	6.9	6.7	13.6	9.2	9	18.2
1,700	3.7	3.5	7.2	6	5.8	11.8	8.3	8.1	16.4
1,800	3.3	3.1	6.4	5.3	5.1	10.4	7.3	7.2	14.5
1,900	3	2.8	5.8	4.7	4.5	9.2	6.6	6.5	13.1
2,000	2.5	2.4	4.9	4	3.7	7.7	5.6	5.5	11.1
Range corresponding to maximum continuous danger space			461			530			625
Aim at foot of object.									

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TABLE IV.—*Ordinates of trajectory above line of sight.—Rifle.*

Horizontal distance.	100 yds.	200 yds.	300 yds.	400 yds.	500 yds.	600 yds.	700 yds.	800 yds.	900 yds.	1,000 yds.	1,100 yds.	1,200 yds.	1,300 yds.	1,400 yds.	1,500 yds.	1,600 yds.	1,700 yds.	1,800 yds.	1,900 yds.	2,000 yds.
	Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
100 yards	0																			
200 yards	0.46	0																		
300 yards	0.99	1.07	0																	
400 yards	1.62	2.32	1.88	0																
500 yards	2.36	3.82	4.12	2.98	0															
600 yards	3.23	5.54	6.70	6.43	4.31	0														
700 yards	4.22	7.53	9.69	10.42	9.30	5.99	0													
800 yards	5.35	9.79	13.07	14.92	14.92	12.74	7.88	0												
900 yards	6.60	12.29	16.83	19.94	21.19	20.26	16.65	10.03	0											
1,000 yards	7.99	15.06	20.99	25.48	28.12	28.57	26.34	21.10	12.46	0										
1,100 yards	9.51	18.10	25.54	31.54	35.69	37.66	36.94	33.21	26.08	15.14	0									
1,200 yards	11.16	21.40	30.49	38.15	43.95	47.56	48.50	46.41	40.93	31.62	18.13	0								
1,300 yards	12.95	24.98	35.87	45.31	52.90	58.31	61.03	60.73	57.03	49.51	37.79	21.45	0							
1,400 yards	14.89	28.87	41.69	53.08	62.61	69.95	74.61	76.25	74.48	68.89	59.10	44.68	25.15	0						
1,500 yards	16.98	33.05	47.96	61.43	73.05	82.47	89.21	92.92	93.23	89.71	82.12	69.52	52.05	29.45	0					
1,600 yards	19.27	37.62	54.82	70.57	84.47	96.17	105.19	111.18	113.76	112.51	107.06	96.96	81.75	60.90	33.83	0				
1,700 yards	21.73	42.54	62.20	80.42	96.77	110.93	122.40	130.84	135.86	137.05	134.03	126.37	113.58	95.16	70.55	39.07	0			
1,800 yards	24.37	47.82	70.11	90.96	109.95	126.74	140.83	151.89	159.52	163.32	162.91	157.85	147.65	131.81	109.78	80.86	44.34	0		
1,900 yards	27.23	53.55	78.70	102.41	124.25	143.89	160.83	174.73	185.20	191.83	194.24	191.99	184.60	171.57	152.32	126.18	92.43	50.84	0	
2,000 yards	30.17	59.42	87.51	114.16	138.95	161.54	181.45	198.30	211.75	221.38	226.80	227.58	223.22	212.77	197.11	172.54	143.76	105.16	57.51	0

TABLE V.—*Ordinates of trajectory above line of sight.—Carbine.*

100 yards	0																			
200 yards	0.50	0																		
300 yards	1.08	1.16	0																	
400 yards	1.76	2.53	2.05	0																
500 yards	2.56	4.13	4.46	3.21	0															
600 yards	3.50	6.00	7.25	6.94	4.66	0														
700 yards	4.56	8.13	10.45	11.20	9.98	6.39	0													
800 yards	5.75	10.51	14.02	15.97	15.94	13.54	8.34	0												
900 yards	7.08	13.16	18.00	21.27	22.57	21.49	17.62	10.60	0											
1,000 yards	8.53	16.06	22.35	27.07	29.82	30.19	27.76	22.19	13.03	0										
1,100 yards	10.11	19.23	27.09	33.40	37.72	39.67	38.82	34.83	27.25	15.79	0									
1,200 yards	11.84	22.68	32.27	40.29	46.34	50.01	50.88	48.60	42.74	32.99	18.92	0								
1,300 yards	13.70	26.41	37.87	47.76	55.67	61.20	63.93	63.52	59.51	51.62	39.40	22.34	0							
1,400 yards	15.72	30.45	43.93	55.84	65.77	73.32	78.06	79.66	77.66	71.78	61.56	46.50	26.16	0						
1,500 yards	17.91	34.82	50.48	64.57	76.69	86.41	93.33	97.11	97.28	93.57	85.47	72.65	54.38	30.42	0					
1,600 yards	20.21	39.42	57.38	73.76	88.15	100.15	109.33	115.35	117.76	116.27	110.42	99.70	83.68	61.81	33.52	0				
1,700 yards	22.74	44.48	64.96	83.87	100.78	115.29	126.98	135.51	140.41	141.41	138.04	129.79	116.23	96.81	70.95	39.86	0			
1,800 yards	25.46	49.92	73.12	94.73	114.35	131.56	145.95	157.16	164.75	168.42	167.71	162.12	151.20	134.41	111.16	82.67	45.39	0		
1,900 yards	28.42	55.83	81.98	106.53	129.09	149.24	166.55	180.69	191.19	197.75	199.94	197.22	189.17	175.23	154.82	129.15	94.67	52.05	0	
2,000 yards	31.58	62.16	91.46	119.18	144.89	168.18	188.63	205.89	219.49	229.18	234.44	234.81	229.82	218.93	201.52	178.87	147.37	107.72	58.60	0

TABLE VI.—*Dangerous spaces, rifle against infantry and cavalry.*

[Calculated under the assumption that the gun when fired is 56 inches from the ground; that the height of a man is 68 inches; that the head of a man on horseback is 8 feet above the ground, and that the gun is aimed at the middle point of the target.]

Distance on line of sight.	Rising branch of trajectory.		Falling branch of trajectory.				Maximum continuous dangerous space.		Total.	
			In front.		In rear.					
	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.
	Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
100 yards	All.	All.	All.	All.	102.49	190.15	202.49	290.15	202.49	290.15
200 yards	All.	All.	All.	All.	109.78	166.27	309.78	366.27	309.78	366.27
300 yards	All.	All.	All.	All.	92.45	132.45	392.45	432.45	392.45	432.45
400 yards	80.39	All.	137.85	All.	72.74	102.50	210.59	502.50	290.98	502.50
500 yards	44.85	176.63	79.95	154.41	56.76	79.24	136.71	233.65	181.56	410.28
600 yards	31.31	108.24	54.70	87.17	43.60	61.11	98.30	148.28	129.61	256.52
700 yards	23.43	79.07	39.99	60.24	34.38	48.31	74.37	108.55	97.80	187.62
800 yards	18.15	61.45	30.88	45.31	27.50	38.83	58.38	84.14	76.53	145.59
900 yards	14.73	49.50	24.59	35.69	22.54	31.74	47.13	67.43	61.86	116.93
1,000 yards	12.20	40.85	19.92	28.72	18.76	26.49	38.68	55.21	50.88	96.06
1,100 yards	10.28	34.34	16.58	23.75	15.77	22.22	32.35	45.97	42.63	80.31
1,200 yards	8.78	29.28	13.84	19.79	13.49	18.99	27.33	38.78	36.11	68.06
1,300 yards	7.58	25.26	11.84	16.83	11.47	16.25	23.31	33.08	30.89	58.34
1,400 yards	6.60	22.00	10.11	14.43	9.94	13.97	20.05	28.40	26.65	50.40
1,500 yards	5.80	19.30	8.77	12.50	8.41	12.07	17.18	24.57	22.98	43.87
1,600 yards	5.13	17.09	7.67	10.88	7.38	10.58	15.05	21.46	20.18	38.55
1,700 yards	4.56	15.20	6.71	9.51	6.50	9.30	13.21	18.81	17.77	34.01
1,800 yards	4.08	13.59	5.90	8.34	5.75	8.19	11.65	16.53	15.73	30.12
1,900 yards	3.65	12.17	5.19	7.34	5.11	7.23	10.30	14.57	13.95	26.74
2,000 yards	3.28	10.94	4.58	6.47	4.56	6.39	9.14	12.86	12.42	23.80

TABLE VII.—*Dangerous spaces, carbine against infantry and cavalry.*

[Calculated under the assumption that the gun when fired is 56 inches from the ground; that the height of a man is 68 inches; that the head of a man on horseback is 8 feet above the ground, and that the gun is aimed at the middle point of the target.]

Distance on line of sight.	Rising branch of trajectory.		Falling branch of trajectory.				Maximum continuous dangerous space.		Total.	
			In front.		In rear.					
	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.	Infantry.	Cavalry.
	Yards.	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*	*Yards.*
100 yards	All.	All.	All.	All.	100.25	183.63	200.25	283.63	200.25	283.63
200 yards	All.	All.	All.	All.	105.11	158.79	305.11	358.79	305.11	358.79
300 yards	All.	All.	All.	All.	87.83	125.53	387.83	425.53	387.83	425.53
400 yards	69.62	All.	121.72	All.	68.79	96.80	190.51	496.80	260.13	496.80
500 yards	40.74	153.27	73.18	133.24	53.06	74.39	126.24	207.63	166.98	360.90
600 yards	28.95	98.26	50.23	79.07	41.43	57.98	91.66	137.05	120.61	235.31
700 yards	21.57	72.69	37.09	55.82	32.83	46.00	69.92	101.82	91.49	174.51
800 yards	17.01	56.87	28.80	42.33	26.51	37.22	55.31	79.55	72.32	136.42
900 yards	13.81	46.03	22.76	33.22	22.05	30.80	44.81	64.02	58.62	110.05
1,000 yards	11.47	38.17	18.76	27.12	18.23	25.54	36.99	52.66	48.46	90.83
1,100 yards	9.68	32.22	15.69	22.60	15.28	21.39	30.97	43.99	40.65	76.21
1,200 yards	8.28	27.56	13.25	18.96	12.94	18.22	26.19	37.18	34.47	64.74
1,300 yards	7.17	23.84	11.32	16.13	11.09	15.63	22.41	31.76	29.58	55.60
1,400 yards	6.26	20.82	9.75	13.89	9.54	13.42	19.29	27.31	25.55	48.13
1,500 yards	5.50	18.30	8.46	12.01	8.27	11.63	16.73	23.64	22.23	41.94
1,600 yards	4.87	16.24	7.37	10.46	7.21	10.16	14.58	20.62	19.45	36.86
1,700 yards	4.34	14.46	6.44	9.13	6.31	8.90	12.75	18.03	17.09	32.40
1,800 yards	3.88	12.93	5.64	7.99	5.55	7.83	11.19	15.82	15.07	28.75
1,900 yards	3.48	11.60	4.95	7.02	4.90	6.90	9.85	13.92	13.33	25.52
2,000 yards	3.13	10.44	4.35	6.18	4.34	6.10	8.69	12.28	11.82	22.72

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APPENDIX B.

MODELS AND TABLES OF PERCENTAGES FOR USE IN PREPARING COMPANY ANNUAL REPORTS OF TARGET FIRING PRESCRIBED BY THE SMALL-ARMS FIRING REGULATIONS, U. S. ARMY.

PREPARED IN OFFICE OF THE INSPECTOR OF SMALL-ARMS PRACTICE, DEPARTMENT OF THE COLORADO, BY FIRST LIEUT. H. A. DRUM, 27TH INFANTRY, A. D. C.

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APPENDIX B.

MODELS AND TABLES OF PERCENTAGES.

INSTRUCTIONS.

The following models and tables will be found of material assistance in preparing the company reports of target firing, and, if closely followed, will result in the saving of much time and labor, and in avoiding inaccuracies. The models, tables, etc., should be carefully studied before commencing reports, and the following should be observed:

1. See that *scores* and *totals* balance in every case; also that *totals* and *aggregates* balance.
2. Enter total for each column at its foot and see that totals of *score columns* and *total columns* balance.
3. In giving percentages use the tables of percentages, being careful to use the proper table. One person should call the scores and another find and call the percentages. To verify, this should be repeated on completion of the column.
4. See that all men are properly classified according to their record.
5. In the case of those not classified, give the authority.
6. In case of failure to complete course, the reason for such failure should be fully set forth.
7. In case of those absent from post during the season, the period of absence and authority therefor will be given.
8. In the case of those prevented from practice through sickness, the certificate of the surgeon should accompany the report; if excused from classification, the authority therefor should be given.
9. Write the names of officers and men legibly.
10. On completion of the report verify with the company target record.

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TABLE I.—*Marksman's course—Scores and percentages.*

Aggregate number of shots, 100. Greatest possible score, 500.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
500	100.00	**482**	96.40	**464**	92.80	**446**	89.20	**428**	85.60	**410**	82.00
499	99.80	**481**	96.20	**463**	92.60	**445**	89.00	**427**	85.40	**409**	81.80
498	99.60	**480**	96.00	**462**	92.40	**444**	88.80	**426**	85.20	**408**	81.60
497	99.40	**479**	95.80	**461**	92.20	**443**	88.60	**425**	85.00	**407**	81.40
496	99.20	**478**	95.60	**460**	92.00	**442**	88.40	**424**	84.80	**406**	81.20
495	99.00	**477**	95.40	**459**	91.80	**441**	88.20	**423**	84.60	**405**	81.00
494	98.80	**476**	95.20	**458**	91.60	**440**	88.00	**422**	84.40	**404**	80.80
493	98.60	**475**	95.00	**457**	91.40	**439**	87.80	**421**	84.20	**403**	80.60
492	98.40	**474**	94.80	**456**	91.20	**438**	87.60	**420**	84.00	**402**	80.40
491	98.20	**473**	94.60	**455**	91.00	**437**	87.40	**419**	83.80	**401**	80.20
490	98.00	**472**	94.40	**454**	90.80	**436**	87.20	**418**	83.60	**400**	80.00
489	97.80	**471**	94.20	**453**	90.60	**435**	87.00	**417**	83.40	**399**	79.80
488	97.60	**470**	94.00	**452**	90.40	**434**	86.80	**416**	83.20	**398**	79.60
487	97.40	**469**	93.80	**451**	90.20	**433**	86.60	**415**	83.00	**397**	79.40
486	97.20	**468**	93.60	**450**	90.00	**432**	86.40	**414**	82.80		
485	97.00	**467**	93.40	**449**	89.80	**431**	86.20	**413**	82.60		
484	96.80	**466**	93.20	**448**	89.60	**430**	86.00	**412**	82.40		
483	96.60	**465**	93.00	**447**	89.40	**429**	85.80	**411**	82.20		

QUALIFYING SCORE FOR RIFLE AND CARBINE: * Marksman, 300; † First class, 250; ‡ Second class, 200.

MARKSMAN'S COURSE.	Total shots.
Slow fire—Two scores, five shots each, at 200, 300, 500, and 600 yards	40
Rapid fire—Two scores, five shots each, at 200 and 300 yards	20
Skirmish fire—Two runs, 20 shots each	40
Aggregate number of shots	100
Greatest possible score	500

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TABLE I.—*Marksman's course—Scores and percentages*—Continued.

Aggregate number of shots, 100. Greatest possible score, 500.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
396	79.20	**374**	74.80	**352**	70.40	**330**	66.00	**308**	61.60	**286**	57.20
395	79.00	**373**	74.60	**351**	70.20	**329**	65.80	**307**	61.40	**285**	57.00
394	78.80	**372**	74.40	**350**	70.00	**328**	65.60	**306**	61.20	**284**	56.80
393	78.60	**371**	74.20	**349**	69.80	**327**	65.40	**305**	61.00	**283**	56.60
392	78.40	**370**	74.00	**348**	69.60	**326**	65.20	**304**	60.80	**282**	56.40
391	78.20	**369**	73.80	**347**	69.40	**325**	65.00	**303**	60.60	**281**	56.20
390	78.00	**368**	73.60	**346**	69.20	**324**	64.80	**302**	60.40	**280**	56.00
389	77.80	**367**	73.40	**345**	69.00	**323**	64.60	**301**	60.20	**279**	55.80
388	77.60	**366**	73.20	**344**	68.80	**322**	64.40	***300**	60.00	**278**	55.60
387	77.40	**365**	73.00	**343**	68.60	**321**	64.20	**299**	59.80	**277**	55.40
386	77.20	**364**	72.80	**342**	68.40	**320**	64.00	**298**	59.60	**276**	55.20
385	77.00	**363**	72.60	**341**	68.20	**319**	63.80	**297**	59.40	**275**	55.00
384	76.80	**362**	72.40	**340**	68.00	**318**	63.60	**296**	59.20	**274**	54.80
383	76.60	**361**	72.20	**339**	67.80	**317**	63.40	**295**	59.00	**273**	54.60
382	76.40	**360**	72.00	**338**	67.60	**316**	63.20	**294**	58.80	**272**	54.40
381	76.20	**359**	71.80	**337**	67.40	**315**	63.00	**293**	58.60	**271**	54.20
380	76.00	**358**	71.60	**336**	67.20	**314**	62.80	**292**	58.40	**270**	54.00
379	75.80	**357**	71.40	**335**	67.00	**313**	62.60	**291**	58.20	**269**	53.80
378	75.60	**356**	71.20	**334**	66.80	**312**	62.40	**290**	58.00	**268**	53.60
377	75.40	**355**	71.00	**333**	66.60	**311**	62.20	**289**	57.80	**267**	53.40
376	75.20	**354**	70.80	**332**	66.40	**310**	62.00	**288**	57.60	**266**	53.20
375	75.00	**353**	70.60	**331**	66.20	**309**	61.80	**287**	57.40	**265**	53.00

QUALIFYING SCORE FOR RIFLE AND CARBINE: * Marksman, 300; † First class, 250; ‡ Second class, 200.

MARKSMAN'S COURSE.	Total shots.
Slow fire—Two scores, five shots each, at 200, 300, 500, and 600 yards	40
Rapid fire—Two scores, five shots each, at 200 and 300 yards	20
Skirmish fire—Two runs, 20 shots each	40
Aggregate number of shots	100
Greatest possible score	500

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TABLE I.—*Marksman's course—Scores and percentages*—Continued.

Aggregate number of shots, 100. Greatest possible score, 500.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
264	52.80	**242**	48.40	**220**	44.00	**198**	39.60	**176**	35.20	**154**	30.80
263	52.60	**241**	48.20	**219**	43.80	**197**	39.40	**175**	35.00	**153**	30.60
262	52.40	**240**	48.00	**218**	43.60	**196**	39.20	**174**	34.80	**152**	30.40
261	52.20	**239**	47.80	**217**	43.40	**195**	39.00	**173**	34.60	**151**	30.20
260	52.00	**238**	47.60	**216**	43.20	**194**	38.80	**172**	34.40	**150**	30.00
259	51.80	**237**	47.40	**215**	43.00	**193**	38.60	**171**	34.20	**149**	29.80
258	51.60	**236**	47.20	**214**	42.80	**192**	38.40	**170**	34.00	**148**	29.60
257	51.40	**235**	47.00	**213**	42.60	**191**	38.20	**169**	33.80	**147**	29.40
256	51.20	**234**	46.80	**212**	42.40	**190**	38.00	**168**	33.60	**146**	29.20
255	51.00	**233**	46.60	**211**	42.20	**189**	37.80	**167**	33.40	**145**	29.00
254	50.80	**232**	46.40	**210**	42.00	**188**	37.60	**166**	33.20	**144**	28.80
253	50.60	**231**	46.20	**209**	41.80	**187**	37.40	**165**	33.00	**143**	28.60
252	50.40	**230**	46.00	**208**	41.60	**186**	37.20	**164**	32.80	**142**	28.40
251	50.20	**229**	45.80	**207**	41.40	**185**	37.00	**163**	32.60	**141**	28.20
†**250**	50.00	**228**	45.60	**206**	41.20	**184**	36.80	**162**	32.40	**140**	28.00
249	49.80	**227**	45.40	**205**	41.00	**183**	36.60	**161**	32.20	**139**	27.80
248	49.60	**226**	45.20	**204**	40.80	**182**	36.40	**160**	32.00	**138**	27.60
247	49.40	**225**	45.00	**203**	40.60	**181**	36.20	**159**	31.80	**137**	27.40
246	49.20	**224**	44.80	**202**	40.40	**180**	36.00	**158**	31.60	**136**	27.20
245	49.00	**223**	44.60	**201**	40.20	**179**	35.80	**157**	31.40	**135**	27.00
244	48.80	**222**	44.40	‡**200**	40.00	**178**	35.60	**156**	31.20	**134**	26.80
243	48.60	**221**	44.20	**199**	39.80	**177**	35.40	**155**	31.00	**133**	26.60

QUALIFYING SCORE FOR RIFLE AND CARBINE: *Marksman, 300; †First class, 250; ‡Second class, 200.

MARKSMAN'S COURSE.	Total shots.
Slow fire—Two scores, five shots each, at 200, 300, 500, and 600 yards	40
Rapid fire—Two scores, five shots each, at 200 and 300 yards	20
Skirmish fire—Two runs, 20 shots each	40
Aggregate number of shots	100
Greatest possible score	500

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TABLE I.—*Marksman's course—Scores and percentages*—Continued.

Aggregate number of shots, 100. Greatest possible score, 500.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
132	26.40	110	22.00	88	17.60	66	13.20	44	8.80	22	4.40
131	26.20	109	21.80	87	17.40	65	13.00	43	8.60	21	4.20
130	26.00	108	21.60	86	17.20	64	12.80	42	8.40	20	4.00
129	25.80	107	21.40	85	17.00	63	12.60	41	8.20	19	3.80
128	25.60	106	21.20	84	16.80	62	12.40	40	8.00	18	3.60
127	25.40	105	21.00	83	16.60	61	12.20	39	7.80	17	3.40
126	25.20	104	20.80	82	16.40	60	12.00	38	7.60	16	3.20
125	25.00	103	20.60	81	16.20	59	11.80	37	7.40	15	3.00
124	24.80	102	20.40	80	16.00	58	11.60	36	7.20	14	2.80
123	24.60	101	20.20	79	15.80	57	11.40	35	7.00	13	2.60
122	24.40	100	20.00	78	15.60	56	11.20	34	6.80	12	2.40
121	24.20	99	19.80	77	15.40	55	11.00	33	6.60	11	2.20
120	24.00	98	19.60	76	15.20	54	10.80	32	6.40	10	2.00
119	23.80	97	19.40	75	15.00	53	10.60	31	6.20	9	1.80
118	23.60	96	19.20	74	14.80	52	10.40	30	6.00	8	1.60
117	23.40	95	19.00	73	14.60	51	10.20	29	5.80	7	1.40
116	23.20	94	18.80	72	14.40	50	10.00	28	5.60	6	1.20
115	23.00	93	18.60	71	14.20	49	9.80	27	5.40	5	1.00
114	22.80	92	18.40	70	14.00	48	9.60	26	5.20	4	.80
113	22.60	91	18.20	69	13.80	47	9.40	25	5.00	3	.60
112	22.40	90	18.00	68	13.60	46	9.20	24	4.80	2	.40
111	22.20	89	17.80	67	13.40	45	9.00	23	4.60		

QUALIFYING SCORE FOR RIFLE AND CARBINE: *Marksman, 300; † First class, 250; ‡ Second class, 200.

MARKSMAN'S COURSE.	Total shots.
Slow fire—Two scores, five shots each, at 200, 300, 500, and 600 yards	40
Rapid fire—Two scores, five shots each, at 200 and 300 yards	20
Skirmish fire—Two runs, 20 shots each	40
Aggregate number of shots	100
Greatest possible score	500

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TABLE II.—*Sharpshooter's course—Scores and percentages.*

Aggregate number of shots, 30. Greatest possible score, 150.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
150	100.00	125	83.33	100	66.67	75	50.00	50	33.33	25	16.67
149	99.33	124	82.67	99	66.00	74	49.33	49	32.67	24	16.00
148	98.67	123	82.00	98	65.33	73	48.67	48	32.00	23	15.33
147	98.00	122	81.33	97	64.67	72	48.00	47	31.33	22	14.67
146	97.33	121	80.67	96	64.00	71	47.33	46	30.67	21	14.00
145	96.67	120	80.00	95	63.33	70	46.67	45	30.00	20	13.33
144	96.00	119	79.33	94	62.67	69	46.00	44	29.33	19	12.67
143	95.33	118	78.67	93	62.00	68	45.33	43	28.67	18	12.00
142	94.67	117	78.00	92	61.33	67	44.67	42	28.00	17	11.33
141	94.00	116	77.33	91	60.67	66	44.00	41	27.33	16	10.67
140	93.33	115	76.67	*90	60.00	65	43.33	40	26.67	15	10.00
139	92.67	114	76.00	89	59.33	64	42.67	39	26.00	14	9.33
138	92.00	113	75.33	88	58.67	63	42.00	38	25.33	13	8.67
137	91.33	112	74.67	87	58.00	62	41.43	37	24.67	12	8.00
136	90.67	111	74.00	86	57.33	61	40.67	36	24.00	11	7.33
135	90.00	110	73.33	†85	56.67	60	40.00	35	23.33	10	6.67
134	89.33	109	72.67	84	56.00	59	39.33	34	22.67	9	6.00
133	88.67	108	72.00	83	55.33	58	38.67	33	22.00	8	5.33
132	88.00	107	71.33	82	54.67	57	38.00	32	21.33	7	4.67
131	87.33	106	70.67	81	54.00	56	37.33	31	20.67	6	4.00
130	86.67	105	70.00	80	53.33	55	36.67	30	20.00	5	3.33
129	86.00	104	69.33	79	52.67	54	36.00	29	19.33	4	2.67
128	85.33	103	68.67	78	52.00	53	35.33	28	18.67	3	2.00
127	84.67	102	68.00	77	51.33	52	34.67	27	18.00	2	1.33
126	84.00	101	67.33	76	50.67	51	34.00	26	17.33	1	.67

QUALIFYING SCORES FOR SHARPSHOOTER: *Rifle, 90; †Carbine, 85.

SHARPSHOOTER'S COURSE.	Total shots.
Slow fire—Two scores, five shots each, at 800 and 1,000 yards	20
Rapid fire—Two scores, five shots each, at 500 yards	10
Aggregate number of shots	30
Greatest possible score	150

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TABLE III.—*Expert rifleman's test—Scores and percentages.*

Aggregate number of shots, 60. Greatest possible score, 300.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
300	100.00	**275**	91.67	**250**	83.33	**225**	75.00	**200**	66.77	**175**	58.33
299	99.67	**274**	91.33	**249**	83.00	**224**	74.67	**199**	66.33	**174**	58.00
298	99.33	**273**	91.00	**248**	82.67	**223**	74.33	**198**	66.00	**173**	57.67
297	99.00	**272**	90.67	**247**	82.33	**222**	74.00	**197**	65.67	**172**	57.33
296	98.67	**271**	90.33	**246**	82.00	**221**	73.67	**196**	65.33	**171**	57.00
295	98.33	**270**	90.00	**245**	81.67	**220**	73.33	**195**	65.00	**170**	56.67
294	98.00	**269**	89.67	**244**	81.33	**219**	73.00	**194**	64.67	**169**	56.33
293	97.67	**268**	89.33	**243**	81.00	**218**	72.67	**193**	64.33	**168**	56.00
292	97.33	**267**	89.00	**242**	80.67	**217**	72.33	**192**	64.00	**167**	55.67
291	97.00	**266**	88.67	**241**	80.33	**216**	72.00	**191**	63.67	**166**	55.33
290	96.67	**265**	88.33	**240**	80.00	**215**	71.67	**190**	63.33	**165**	55.00
289	96.33	**264**	88.00	**239**	79.67	**214**	71.33	**189**	63.00	**164**	54.67
288	96.00	**263**	87.67	**238**	79.33	**213**	71.00	**188**	62.67	**163**	54.33
287	95.67	**262**	87.33	**237**	79.00	**212**	70.67	**187**	62.33	**162**	54.00
286	95.33	**261**	87.00	**236**	78.67	**211**	70.33	**186**	62.00	**161**	53.67
285	95.00	**260**	86.67	**235**	78.33	**210**	70.00	**185**	61.67	**160**	53.33
284	94.67	**259**	86.33	**234**	78.00	**209**	69.67	**184**	61.33	**159**	53.00
283	94.33	**258**	86.00	**233**	77.67	**208**	69.33	**183**	61.00	**158**	52.67
282	94.00	**257**	85.67	**232**	77.33	**207**	69.00	**182**	60.67	**157**	52.33
281	93.67	**256**	85.33	**231**	77.00	**206**	68.67	**181**	60.33	**156**	52.00
280	93.33	**255**	85.00	**230**	76.67	**205**	68.33	**180**	60.00	**155**	51.67
279	93.00	**254**	84.67	**229**	76.33	***204**	68.00	**179**	59.67	**154**	51.33
278	92.67	**253**	84.33	**228**	76.00	**203**	67.67	**178**	59.33	**153**	51.00
277	92.33	**252**	84.00	**227**	75.67	**202**	67.33	**177**	59.00	**152**	50.67
276	92.00	**251**	83.67	**226**	75.33	†**201**	67.00	**176**	58.67	**151**	50.33

QUALIFYING SCORES EXPERT RIFLEMAN: *Rifle, 204; †Carbine, 201.

EXPERT RIFLEMAN'S TEST.	Total shots.
Slow fire—One score, five shots each, at 200, 300, and 600 yards	15
Two scores, five shots each, at 1,000 yards	10
Timed fire—One score, five shots each, at 200, 300, and 600 yards	15
Skirmish fire—One run, 20 shots	20
Aggregate number of shots	60
Greatest possible score	300

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TABLE III.—*Expert rifleman's test—Scores and percentages*—Continued.

Aggregate number of shots, 60. Greatest possible score, 300.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
150	50.00	125	41.67	100	33.33	75	25.00	50	16.67	25	8.33
149	49.67	124	41.33	99	33.00	74	24.67	49	16.33	24	8.00
148	49.33	123	41.00	98	32.67	73	24.33	48	16.00	23	7.67
147	49.00	122	40.67	97	32.33	72	24.00	47	15.67	22	7.33
146	48.67	121	40.33	96	32.00	71	23.67	46	15.33	21	7.00
145	48.33	120	40.00	95	31.67	70	23.33	45	15.00	20	6.67
144	48.00	119	39.67	94	31.33	69	23.00	44	14.67	19	6.33
143	47.67	118	39.33	93	31.00	68	22.67	43	14.33	18	6.00
142	47.33	117	39.00	92	30.67	67	22.33	42	14.00	17	5.67
141	47.00	116	38.67	91	30.33	66	22.00	41	13.67	16	5.33
140	46.67	115	38.33	90	30.00	65	21.67	40	13.33	15	5.00
139	46.33	114	38.00	89	29.67	64	21.33	39	13.00	14	4.67
138	46.00	113	37.67	88	29.33	63	21.00	38	12.67	13	4.33
137	45.67	112	37.33	87	29.00	62	20.67	37	12.33	12	4.00
136	45.33	111	37.00	86	28.67	61	20.33	36	12.00	11	3.67
135	45.00	110	36.67	85	28.33	60	20.00	35	11.67	10	3.33
134	44.67	109	36.33	84	28.00	59	19.67	34	11.33	9	3.00
133	44.33	108	36.00	83	27.67	58	19.33	33	11.00	8	2.67
132	44.00	107	35.67	82	27.33	57	19.00	32	10.67	7	2.33
131	43.67	106	35.33	81	27.00	56	18.67	31	10.33	6	2.00
130	43.33	105	35.00	80	26.67	55	18.33	30	10.00	5	1.67
129	43.00	104	34.67	79	26.33	54	18.00	29	9.67	4	1.33
128	42.67	103	34.33	78	26.00	53	17.67	28	9.33	3	1.00
127	42.33	102	34.00	77	25.67	52	17.33	27	9.00	2	.67
126	42.00	101	33.67	76	25.33	51	17.00	26	8.67		

QUALIFYING SCORES FOR EXPERT RIFLEMAN: *Rifle, 204; †carbine, 201.

EXPERT RIFLEMAN'S TEST.	Total shots.
Slow fire—One score, five shots each, at 200, 300, and 600 yards	15
Two scores, five shots each, at 1,000 yards	10
Timed fire—One score, five shots each, at 200, 300, and 600 yards	15
Skirmish fire—One run, 20 shots	20
Aggregate number of shots	60
Greatest possible score	300

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Divisors for computing collective fire.

Enlisted strength of company.	Divisor. Figure representing 85 per cent of strength of company × 3.	Enlisted strength of company.	Divisor. Figure representing 85 per cent of strength of company × 3.	Enlisted strength of company.	Divisor. Figure representing 85 per cent of strength of company × 3.
112	285.6	81	206.5	50	127.5
111	283.0	80	204.0	49	124.9
110	280.5	79	201.4	48	122.4
109	277.9	78	198.9	47	119.8
108	275.4	77	196.3	46	117.3
107	272.8	76	193.8	45	114.7
106	270.3	75	191.2	44	112.2
105	267.7	74	188.7	43	109.6
104	265.2	73	186.1	42	107.1
103	262.6	72	183.6	41	104.5
102	260.1	71	181.0	40	102.0
101	257.5	70	178.5	39	99.4
100	255.0	69	175.9	38	96.9
99	252.4	68	173.4	37	94.3
98	249.9	67	170.8	36	91.8
97	247.3	66	168.3	35	89.2
96	244.8	65	165.7	34	86.7
95	242.2	64	163.2	33	84.1
94	239.7	63	160.6	32	81.6
93	237.1	62	158.1	31	79.0
92	234.6	61	155.5	30	76.5
91	232.0	60	153.0	29	73.9
90	229.5	59	150.4	28	71.4
89	226.9	58	147.9	27	68.8
88	224.4	57	145.3	26	66.3.
87	221.8	56	142.8	25	63.7
86	219.3	55	140.2	24	61.2
85	216.7	54	137.7	23	58.6
84	214.2	53	135.1	22	56.1
83	211.6	52	132.6	21	53.5
82	209.1	51	130.0	20	51.0

NOTE.—*Collective fire and collective figure of merit.*—In volley firing, three volleys are fired at each of the distances, 600, 800, and 1,000 yards; in fire at will, three shots are fired at each of the distances, 600, 800, and 1,000 yards.

Volley firing, shots per man	9
Fire at will, shots per man	9
Total number shots per man in collective fire	18

Method of computing.—"The results of the three volleys at each range, expressed in percentage, will be obtained by multiplying the total number of hits by 100 and dividing the product by three times the number expressing 85 per cent of all enlisted men borne on the rolls of the company regardless of the number firing. In computing the percentage the figures will be carried only to one place of decimals. The average percentage of the company for volley fire at all ranges will be obtained by dividing the sum of the percentages at each range by the number of ranges; the results of the fire at will will be calculated in the same manner."

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TABLE V.—*Scores and percentages in pistol firing.*

DISMOUNTED COURSE.

FOR FIRING AT BULL'S-EYE TARGET A AND DISAPPEARING TARGET.

Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
100	100.00	**83**	83.00	**66**	66.00	**49**	49.00	**32**	32.00	**15**	15.00
99	99.00	**82**	82.00	**65**	65.00	**48**	48.00	**31**	31.00	**14**	14.00
98	98.00	**81**	81.00	**64**	64.00	**47**	47.00	**30**	30.00	**13**	13.00
97	97.00	**80**	80.00	**63**	63.00	**46**	46.00	**29**	29.00	**12**	12.00
96	96.00	**79**	79.00	**62**	62.00	**45**	45.00	**28**	28.00	**11**	11.00
95	95.00	**78**	78.00	**61**	61.00	**44**	44.00	**27**	27.00	**10**	10.00
94	94.00	**77**	77.00	**60**	60.00	**43**	43.00	**26**	26.00	**9**	9.00
93	93.00	**76**	76.00	**59**	59.00	**42**	42.00	**25**	25.00	**8**	8.00
92	92.00	**75**	75.00	**58**	58.00	**41**	41.00	**24**	24.00	**7**	7.00
91	91.00	**74**	74.00	**57**	57.00	**40**	40.00	**23**	23.00	**6**	6.00
90	90.00	**73**	73.00	**56**	56.00	**39**	39.00	**22**	22.00	**5**	5.00
89	89.00	**72**	72.00	**55**	55.00	**38**	38.00	**21**	21.00	**4**	4.00
88	88.00	**71**	71.00	**54**	54.00	**37**	37.00	**20**	20.00	**3**	3.00
87	87.00	**70**	70.00	**53**	53.00	**36**	36.00	**19**	19.00	**2**	2.00
86	86.00	**69**	69.00	**52**	52.00	**35**	35.00	**18**	18.00	**1**	1.00
85	85.00	**68**	68.00	**51**	51.00	**34**	34.00	**17**	17.00		
84	84.00	**67**	67.00	**50**	50.00	**33**	33.00	**16**	16.00		

DISMOUNTED COURSE.

Firing at bull's-eye target A, two scores of 5 shots each at each of the distances, 25 and 50 yards.

Greatest possible score..... 100

Firing at disappearing target, two scores of 5 shots each at each of the distances, 15 and 25 yards.

Greatest possible score..... 100

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TABLE V.—*Scores and percentages in pistol firing*—Continued.

MOUNTED COURSE.

For Firing at Target H.								For Firing at Target M.			
Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.	Score.	Per cent.
50	100.00	35	70.00	20	40.00	5	10.00	30	100.00	15	50.00
49	98.00	34	68.00	19	38.00	4	8.00	29	96.67	14	46.67
48	96.00	33	66.00	18	36.00	3	6.00	28	93.33	13	43.33
47	94.00	32	64.00	17	34.00	2	4.00	27	90.00	12	40.00
46	92.00	31	62.00	16	32.00	1	2.00	26	86.67	11	36.67
45	90.00	30	60.00	15	30.00			25	83.33	10	33.33
44	88.00	29	58.00	14	28.00			24	80.00	9	30.00
43	86.00	28	56.00	13	26.00			23	76.67	8	26.67
42	84.00	27	54.00	12	24.00			22	73.33	7	23.33
41	82.00	26	52.00	11	22.00			21	70.00	6	20.00
40	80.00	25	50.00	10	20.00			20	66.67	5	16.67
39	78 00	24	48.00	9	18.00			19	63.33	4	13.33
38	76.00	23	46.00	8	16.00			18	60.00	3	10.00
37	74.00	22	44.00	7	14.00			17	56.67	2	6.67
36	72.00	21	42.00	6	12.00			16	53.33	1	3.33

MOUNTED COURSE.

In mounted practice at H target 25 shots are fired. As a hit, direct or ricochet, in this target above a horizontal line drawn across its middle point is scored two, a hit below the line being scored one, the greatest possible score is 50.

In mounted practice at M target 15 shots are fired. As a hit, direct or ricochet, on this target above a horizontal line drawn from the lowest point of the horse's head is scored two, a hit below the line being scored one, the greatest possible score is 30.

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APPENDIX C.

RECORDS AND REPORTS.

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year 190—.

Organization.	Estimating distance.	Ind					Pistol firing.			Remarks.
Regiments.	Average per cent of accuracy for best five consecutive estimates between 500 and 1,000 yards. (Consider only those qualifying in range practice.)	Average strength, present and absent, commissioned and enlisted, for the entire period of firing.	Total number qualified.	Total per ent at all ranges.		Collective figure of merit. (Paragraph 256.)	General figure of merit	Average per cent, dismounted course.	Average per cent, mounted course.	Average per cent, total.	
Companies.			Volley fire.	Fire at will.							
Posts:											

quarters ----------

Date, ----------, *190—*.

Inspector of Small-Arms Practice.

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Form No. 673.

REPORT OF SMALL-ARMS FIRING OF TROOPS

IN THE

Department of .....

For the Year 19—.

To be compiled from the records received from posts and forwarded not later than November 20 by the Department Commander to the Adjutant General of the Division.

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Form No. 676.

(Authorized January 1, 1904.)

*Collective fire of Company*_____, _____*Regiment of*_____, *190—*.

Range, Yards.	Enlisted strength on date of firing.	Number actually firing.	Volley fire.					Fire at will.				
			Number of hits at each range.				Percentage computed as per regulations.	Number of hits at each range.				Percentage computed as per regulations.
			Lying.	Kneeling.	Standing.	Total.		Lying.	Kneeling.	Standing.	Total.	
600												
800												
1,000												
Aggregate percentage for each class of fire												
Average percentage for each class of fire												
Aggregate percentage for collective fire												
Collective figure of merit												

*Figure of merit of Company*____, _____*Regiment of*_____, *190—*.

INDIVIDUAL FIGURE OF MERIT.

Number of expert riflemen_____ _____ × 200 = _____

Number of sharpshooters _____ _____ × 150 = _____

Number of marksmen _____ _____ × 100 = _____

Number of first-class men_____ _____ × 75 = _____

Number of second-class men____ _____ × 50 = _____

Number of third-class men_____ _____ × 10 = _____

Present but not firing _____ _____ × 0 = _____

) _____

Individual figure of merit _____ _____

Collective figure of merit _____ _____

2) _____

General figure of merit _____ _____

A correct report:

_____

Captain, _____

Commanding _____

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Form No. 679.
(Authorized January 1, 1904.)

Report of expert riflemen in Company ------, ---------- *Regiment of* ----------, ----------, *190—*

No.	Names.	Rank.	Scores made in expert rifleman's test.				Per cent of possible.
			Slow fire.	Timed fire.	Skirmish fire.	Aggregate.	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

A correct report:

Post of ----------

Date,----------

Captain, ------ *Regiment of* ----------

Commanding.

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Form No. 679.

REPORT OF EXPERT RIFLEMEN

IN

Company _____

_____ *Regiment of* _____

_____, *190—*

Post of _____

NOTE.—To be received and forwarded by the Post Commander not later than November 5.

If there be no expert riflemen in the company, this report will be rendered in blank.

Consolidated reports of expert riflemen will be forwarded by division commanders to the Adjutant General of the Army not later than December 1.

1st indorsement.

_____

_____

Respectfully forwarded to the Adjutant General, Department of _____

I have examined the methods of conducting practice, and of marking and scoring in this Company, and believe this report to be correct.

_____

_____

Commanding Post.

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Form No. 680.
(Authorized January 1, 1904.)

REPORT OF SUPPLEMENTARY TARGET FIRING.

Co. ------, ---------- *Regiment of* ---------, *during month of* ---------- *190—.*

Number of recruits taking instruction practice, marksman's course ---------- ____

Number of third-class men receiving instruction practice, marksman's course ---------- ____

Number of recruits taking special course "A" ---------- ____

Number of recruits taking special course "B" ---------- ____

Reasons for following special course "A" or "B":

Remarks:

A correct report:

Captain, ------- *Regiment of* ----------
Commanding.

Post of ----------

Date, ----------

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Form No. 680.

REPORT OF SUPPLEMENTARY TARGET FIRING

IN

------*Regiment of*----------

during the month of ----------*190—.*

NOTE.—To be received and forwarded by the Post Commander within ten days after the close of supplementary season.

1st indorsement.

Respectfully forwarded to the Adjutant General, Department of ----------

---

Commanding Post.

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Form No. 681.
(Authorized January 1, 1904.)

Report of small-arms firing of the troops in the State of _____ for the year 190—.

Organization.		Rifle and carbine firing.											Total firing, rifle and carbine.	Total firing, pistol.	Figure of merit previous year.	Remarks.
		Classification and figure of merit.														
Regiment.	Co.	Average strength, present and absent, commissioned and enlisted, for the entire period of firing.	Total number classified.	Per cent of average strength classified.	Expert riflemen.	Sharpshooters.	Marksmen.	First-class men.	Second-class men.	Third-class men.	Fourth-class men.	Figure of merit.				

Approved:

_____

_____
Adjutant General, State of _____

Headquarters _____

Date, _____, *190—*.

A correct compilation from the records:

_____

_____
Inspector of Small-Arms Practice.

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Form No. 681.

REPORT OF SMALL-ARMS FIRING OF THE TROOPS

IN THE

*State of*_____

for the Year 190—.

NOTE.—If there is not sufficient space on this blank, add other pages.

To be forwarded to the Adjutant General of the Army not later than November 20.

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the year 190—.

Competitor's number.	Skirmish fire.						For entire competition.	
	tal.	Penalties.	Score for run.	Order for run.	For entire skirmish fire.			
					Aggregate.	Order.	Grand aggregate.	Order.

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Form No. 683.
(Authorized January 1, 1904.)

Report and bulletin of the ---------- *pistol competition at* ---------- *for the year 190—*

Competition number.	Names.	Rank.	Company.	Regiment.	Slow fire.				Timed fire.			Aggregate for slow fire and timed fire.	Order in slow fire and timed fire.	Rapid fire.			Aggregate for slow fire, timed fire, and rapid fire.	Final order in competition.	
					50 yards.	75 yards.	Total.	Order in slow fire.	25 yards.	50 yards.	Total.			15 yards.	25 yards.	Total.			

Approved:

Officer in charge.

A correct transcript from the records of the competition:

Statistical officer.

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Form No. 683.

REPORT AND BULLETIN

OF THE

---------- *Pistol Competition*

AT

For the Year 190—.

1st indorsement.

Headquarters ----------

----------, *190—.*

Respectfully forwarded to the Adjutant General of the Army.

---------- *General,*
Commanding.

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